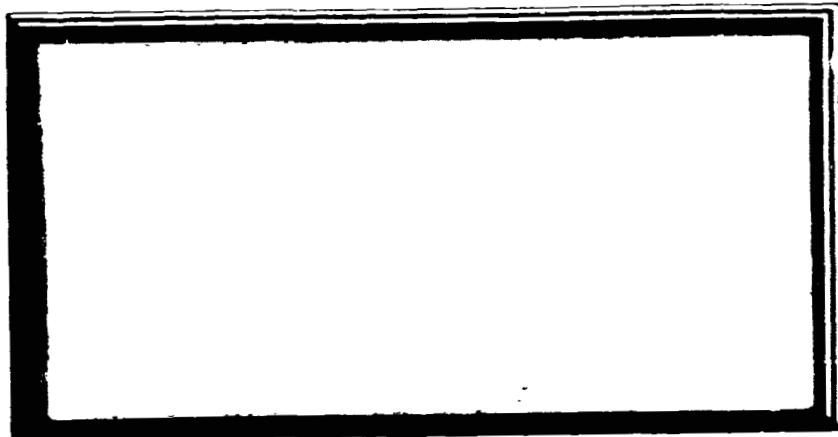


SPACE DIVISION



FACILITY FORM 602

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GENERAL ELECTRIC

DOCUMENT NO. 70-HVO-39

**DETERMINATION OF THE
WIND RESPONSE OF SATURN V
BY STATISTICAL METHODS
VOLUME II**

DECEMBER 24, 1970

CONTRACT NO. NAS8-25477

**GENERAL ELECTRIC
APOLLO SYSTEMS
HUNTSVILLE OPERATIONS
HUNTSVILLE, ALABAMA**

ACKNOWLEDGEMENT

Many computer programs were developed during the conduct of this effort. Barry J. Gaggini was the prime contributer in developing these programs. Henry Graf and Donald Hurd provided vehicle simulation model support as well as assistance in program development.

CONTENTS

- 1.0 Introduction**
- 2.0 Six-Degree-Of-Freedom Vehicle Model**
- 3.0 Adjoint Model**
- 4.0 Parameter Optimization Synthesis Method**
- 5.0 Constrained Response Filter Synthesis Method.**

1.0 INTRODUCTION

This volume of the final report contains listings
of all the computer programs used in the conduct of
this effort.

2.0 SIX-DEGREE-OF-FREEDOM VEHICLE MODEL

The 6 D.O.F. Model was used to obtain time varying coefficients for the Adjoint Vehicle Model. The program uses the Dynasar Algorithm and is programmed on the IBM 7094 computer.

\$JOB CILL FITZ JOB14200,354130,00,11,140E

\$EXECUTE SPJOK

FORTRAN

*ID 35/P MULMES RIV 32 ,360700,05,12,02UE

* XEQ

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3 P 9 7 7 +L 0

* DATA

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3XT,6=.109.9904,150.2566,240.6594,346.5096,509.5602,745.2203,

3XT,12=.1062.592,1470.951,2072.014,2911.889,4057.964,5610.429,

3XT,18=.7689.332,10434.738,13889.154,17992.182,22817.47,28106.737.

3XT,24=,33924.476,40066.831,46426.224,52807.411,59220.769,

3XT,29=,65467.358,

3XT,30=,71413.413,76967.782,82033.247,86550.584,90476.079,

3XT,35=,94194.803,

3XT,36=,98194.555,98777.433,100191.32,101178.09,101474.29,

3XT,41=,101646.79,

3XT,42=,101700.57,

3YT,2723.600,2715.600,2712.600,2708.800,2705.400,2702.814,

3YT,6=,2697.928,2693.624,2687.732,2687.183,2677.118,2672.396,

3YT,12=,2668.062,2664.100,2660.178,2656.440,2652.746,2648.969,

3YT,18=,2644.166,2641.299,2637.721,2634.496,2631.207,2628.138,

3YT,24=,2625.311,2623.688,2623.548,2623.062,2622.266,2620.988,

3YT,30=,2619.323,2617.684,2616.042,2614.558,2613.273,2612.171,

3YT,36=,2611.007,2610.389,2609.636,2609.129,2609.027,2609.326,

3YT,42=,2608.541,

=BOX,797,14,799,43,2,

SIDEN,10,THRUSTL=F(P)

3XT,20.00,37.64712,45.3064,58.9986,72.4798,86.1251,109.9904,

3XT,7=,156.2566,240.6594,346.5096,509.5602,745.2203,1062.592,

3XT,13=,1470.951,2072.014,2911.889,4057.964,5610.429,7689.332,

3XT,19=,10434.738,13889.154,17992.182,22817.47,28106.737,

3XT,24=,33924.476,

3XT,25=,40066.831,46426.224,52807.411,59220.769,65467.358,

3XT,30=,71413.413,

3XT,31=,76967.78,82033.247,86550.584,90476.079,94194.803,

3XT,36=,98194.555,

3XT,37=,98777.433,100191.32,101178.09,101474.29,101646.79,

3XT,42=,101700.57,

3YT,8112000.0,8095000.0,8089000.0,8078000.0,8070423.5,8062465.7,

3YT,6=,8053191.2,

3YT,7=,8034833.4,8016706.18,7999355.5,7982836.6,7966604.3,

3YT,12=,7950666.4,

3YT,13=,7934914.4,7917355.6,7897946.3,7812603.0,7848965.4,

3YT,18=,7817016.6,

3YT,19=,7776204.3,7733228.6,7682768.2,7624930.0,7563112.5,

3YT,24=,7496732.9,

3YT,25=,7430175.9,7366880.2,7301820.8,7235517.7,7169477.0,

3YT,30=,7105283.3,

3YT,31=,7045073.3,6989722.6,6940304.9,6897377.1,6857050.6,

3YT,36=,6813666.4,

3YT,37=,6806020.0,6789647.0,6778277.4,6774966.2,6774101.5,

3YT,42=,6771215.5,

=BOX,798,14,799,43,2,

5IDEN,10, PRESSURE = FLALT

3XT,0.,1000.,2000.,3000.,4000.,5000.,

3XT,6=,6./3,7./3,8./3,9./3,10./3,12./3,

3XT,12=,14./3,16./3,18./3,20./3,25./3,30./3,

3XT,18=,35./3,40./3,45./3,50./3,60./3,70./3,

3XT,24=,80./3,90./3,

3YT,1.0133/5,8.9876/4,7.9501/4,7.0121/4,6.166/4,5.4048/4,

3YT,6=,4.7218/4,4.1105/4,3.5652/4,3.0801/4,2.65/4,1.9399/4,

3YT,12=,1.417/4,1.0353/4,7.5652/3,5.5293/3,2.5492/3,1.197/3,

3YT,18=,574.59,287.14,149.1,79.779,22.461,5.5205,

3YT,24=,1.0366,1.6438,

=BOX,799,14,719,26,2,

=BOX,800,9,801,804,805,,3.269,-3.269,3.269,

=BOX,801,9,810,808,809,811,-1,,, -1,

=BOX,802,13,795,-803,,,3.269,844,771,

=BOX,803,9,804,805,

=BOX,804,13,701,-816,,,,,703,-817,

=BOX,805,13,706,-818,,,,,707,-819,

=BOX,806,13,795,-807,-1,,,3.269,843,771,

=BOX,807,9,810,808,809,811,

=BOX,808,11,703,813,

=BOX,809,11,706,814,

=BOX,810,11,701,812,

=BOX,811,11,707,815,

=BOX,812,11,820,826,,-827,

=BOX,813,11,828,831,,-832,

=BOX,814,11,833,831,,-832,

=BOX,815,11,838,826,,-827,

=BOX,816,11,820,824,-1,,-825,

=BOX,817,11,828,824,-1,,-825,

=BOX,818,11,833,836,-1,,-837,

=BOX,819,11,838,836,-1,,-837,

=BOX,820,19,771,.,.5,,-821,

=BOX,821,9,822,823,.,.,1,

=BOX,822,11,824,824,,-825,-825,

=BOX,823,11,826,826,,-827,-827,

=BOX,824,21,505,

=BOX,825,21,505,,-1,1.5708,

=BOX,826,21,507,

=BOX,827,21,507,,-1,1.5708,

=BOX,828,19,771,.,.5,,-829,

=BOX,829,9,822,830,.,.,1,

=BOX,830,11,831,831,,-832,-832,

=BOX,831,21,508,

=BOX,832,21,508,,-1,1.5708,

=BOX,833,19,771,.,.5,,-834,

=BOX,834,9,835,830,.,.,1,

=BOX,835,11,836,836,,-837,-837,

=BOX,836,21,506,,-1,1.5708,

=BOX,837,21,506,,-1,1.5708,

=80X,838,19,7/1,,,,-5,,,-839,

=80X,839,9,835,823,,,,-1,

=80X,840,9,841,842,

=80X,841,13,701,-820,,,,-703,-828,

=80X,842,13,706,-833,,,,-707,-838,

=80X,843,9,841,842,,,,-1,

=80X,844,9,845,846,

=80X,845,13,701,-820,,,,-1,703,-828,

=80X,846,13,706,-833,-1,,,,-707,-838,

=80X,900,7,901,0,,1,

=80X,901,7,902,0,,1,

=80X,902,9,903,907,906,,,,-1,-.02,

=80X,903,13,908,904,

=80X,904,12,905,136722,-34949,-175065,118659,-44536,8810,-717.8,

=80X,905,13,711,771,:1/6,

=80X,906,11,901,946,

=80X,907,11,900,945,

=80X,908,9,909,912,

=80X,909,9,910,911,,,,-1,-1,

=80X,910,11,803,418,,,,-987,

=80X,911,11,807,403,,,,-987,

=80X,912,11,913,401,79.46,

=80X,913,9,914,929,934,

=80X,914,13,963,-988,,,,-964,-989,

=80X,915,9,424,917,1021,

=80X,916,9,424,918,1022,

=80X,917,11,975,900,10/-4,

=80X,918,11,976,900,10/-4,

=80X,919,13,967,-992,,,,-968,-993,

=80X,920,9,424,922,1025,

=80X,921,9,424,923,1026,

=BX,922,11,979,900,10/-4,

=BX,923,11,980,900,10/-4,

=BX,924,13,969,-994,,,970,-995,

=BX,925,9,424,927,1027,

=BX,926,1,424,928,1028,

=BX,927,11,981,900,10/-4,

=BX,928,11,982,900,10/-4,

=BX,929,13,965,-990,,,966,-991,

=BX,930,9,424,932,1023,

=BX,931,9,424,933,1024,

=BX,932,11,977,900,10/-4,

=BX,933,11,978,900,10/-4,

=BX,934,9,919,935,924,940,

=BX,935,13,971,-996,,,972,-971,

=BX,936,9,424,938,1029,

=BX,937,9,424,939,1030,

=BX,938,11,983,900,10/-4,

=BX,939,11,984,900,10/-4,

=BX,940,13,974,-999,,,973,-998,

=BX,941,9,424,943,1031,

=BX,942,9,424,944,1032,

=BX,943,11,985,900,10/-4,

=BX,944,11,986,900,10/-4,

=BX,945,11,946,946,

=BX,946,12,905,-78.01,32.46,98.74,-66.06,24.52,-4.79,,3845,

=BX,947,13,403,-917,,,403,-1021,

=BX,948,13,418,-917,,,418,-1021,

=BX,949,13,951,-403,,,752,-403,

=BX,950,13,951,-418,,,952,-418,

=BX,951,11,901,982,,1/-3,

=BX,952,11,1001,1083,,1/-3,

=BX,953,13,928,-403,,,1028,-403,

=BX,954,13,928,-418,,,1028,-418,

=BX,958,13,1105,959,

=BX,959,9,1106,950,,,05,

=BX,960,13,963,-401,79.40/-6,,,79.46/-6,964,-401,

SIDEN,10,CN(M,ALPHA) SEG 0

3ZT,0,.198,.2965,.355,.387,

.418,.445,0,.203,.3,

.358,.393,.427,.453,0,

.2095,.308,.367,.401,.434,

.4638,0,.226,.334,

0.39300,0.43400,0.47400,0.50100,0.00000,

0.29600,0.37200,0.43300,0.47900,0.51000,

0.54900,0.00000,0.27400,0.33000,0.36700,

0.39700,0.42600,0.45200,0.00000,0.24600,

0.29700,0.33600,0.37100,0.40000,0.42900,

0.00000,0.20600,0.25600,0.29000,0.31700,

0.34400,0.36900,0.00000,0.18600,0.23200,

0.26300,0.28600,0.31000,0.33200,0.00000,

0.16600,0.20600,0.23700,0.25800,0.27600,

0.29500,0.00000,0.14600,0.17700,0.20600,

0.23100,0.25000,0.30920,0.00000,0.15413,

0.18465,0.20900,0.22430,0.23300,0.28160,

3XT,0,.4,.6,.8,.9,

3XT,5=,1,1.2,1.5,1.7,2,

3XT,10=,2.75,4,

3YT,0,.10472,.13963,.17453,.20944,

3YT,5=,.24435,.27925,

3AK,12,7,2,2,

=BX,963,15,700,915,

SIDEN,10,CN(M,ALPHA) SEG 1

3ZT,0,.0311,.035,.0596,.07915,

.113,.1749,0,.03184,.03535,

.0602,.0804,.1152,.178,0,

.03288,.03636,.0517,.0819,.1172,

.1821,0,.0355,.0394,

0.06600,0.08860,0.12800,0.19700,0.00.00,

0.02462,0.05730,0.08390,0.11770,0.14085,

0.18320,0.00000,0.03940,0.05910,0.07880,

0.11200,0.15800,0.21670,0.00000,0.02068,

0.03448,0.04728,0.09550,0.15760,0.21670,

0.00000,0.00790,0.01400,0.03940,0.09850,

0.14400,0.23200,0.00000,0.00394,0.02758,

0.04531,0.10244,0.17730,0.27580,0.00000,

0.00197,0.03743,0.07195,0.1359,0.21670,

0.31717,0.00000,0.00985,0.05910,0.11800,

0.19300,0.27100,0.33520,0.00000,0.01040,

0.06165,0.11975,0.18737,0.22150,0.30>30,

3XT,0,.4,.6,.8,.9,

3XT,5=,1,1.2,1.5,1.7,2,

3XT,10=,2.75,4,

3YT,0,.10472,.13963,.17453,.20944,

3YT,5=,.24435,.27925,

3AK,12,.,2,2,

=BOX,964,15,700,916,

5IDEN,10,CN(M,ALPHA) SEG 2

3ZT,0,.02365,.03505,.05305,.0761,

.0903,.1411,0,.02424,.01588,

.054,.0775,.0918,.1435,0,

.02502,.0369,.0555,.0795,.0943,

.147>.0,.027,.04,

0.06000,0.08600,0.10200,0.15950,0.00000,

0.02100, 0.03700, 0.05270, 0.08720, 0.13800,

0.17800, 0.06000, 0.02590, 0.05370, 0.08400,

0.10500, 0.14900, 0.18560, 0.00000, 0.00915,

0.02975, 0.04255, 0.09165, 0.12925, 0.17020,

0.00000, 0.00200, 0.01400, 0.04100, 0.10000,

0.15100, 0.23800, 0.00600, 0.00660, 0.02600,

0.02640, 0.11165, 0.18035, 0.27085, 0.00000,

0.00310, 0.04465, 0.07655, 0.13875, 0.22000,

0.32030, 0.00000, 0.01960, 0.06360, 0.12000,

0.19050, 0.27600, 0.34140, 0.00000, 0.02070,

0.06635, 0.12160, 0.18490, 0.22560, 0.31090,

3XT, 0, .4, .6, .8, .9,

3XT, 5=, 1, 1.2, 1.5, 1.7, 2,

3XT, 10=, 2, 75, 4,

3YT, 0, .10472, .13963, .17423, .20944,

3YT, 5=, .24435, .27925,

3AK, 12, 7, 2, 2,

=BOX, 965, 15, 700, 930,

5IDEN, 10, CN(M, ALPHA) SEG 3

3ZT, 0, .01203, .023, .03454, .03807,

.0397, .05445, 0, .01223, .0234,

.0351, .0387, .0404, .0554, 0,

.01258, .02404, .03605, .0398, .0415,

.0569, 0, .0136, .026,

0.03900, 0.04300, 0.04990, 0.06150, 0.00000,

0.01780, 0.01370, 0.01435, 0.03300, 0.03600,

0.06950, 0.00000, -.07740, -.08920, -.10020,

-.06010, -.00820, 0.01180, 0.00000, 0.01285,

0.02060, 0.04780, 0.07050, 0.09475, 0.10180,

0.00000, 0.03500, 0.06460, 0.09750, 0.12700,

0.17300, 0.21000, 0.00000, 0.03295, 0.06080,

0.11455,0.14160,0.15345,0.17760,0.00000,

0.04225,0.03140,0.10620,0.14090,0.17290,

0.20400,0.00000,0.05610,0.07200,0.10700,

0.14200,0.19400,0.23395,0.00000,0.05920,

0.07511,0.10860,0.13780,0.15860,0.21850,

3XT,0,.4,.6,.8,.9,

3XT,5=,1,1.2,1.5,1.7,2,

3XT,10=,2.75,4,

3YT,0,.10472,.13963,.17453,.20944,

3YT,5=,.24435,.27925,

34K,12,7,2,2,

=80X,966,15,700,931,

5IDEN,10,CN(M,ALPHA) SEG 4

3ZT,0,-.00491,.01035,.02018,.0776,

.0935,.124,0,-.005,.01052,

.02054,.079,.0951,.1261,0,

-.00513,.01082,.02108,.0812,.0977,

.1295,0,-.0055,.0117,

0.02280,0.03785,0.10580,0.14010,0.00000,

-.00410,0.02315,0.06165,0.12285,0.16115,

0.23700,0.00000,0.10340,0.15555,0.21220,

0.25825,0.27445,0.31550,0.00000,0.06060,

0.09630,0.12295,0.15230,0.19385,0.23705,

0.00000,0.05805,0.08320,0.11160,0.12480,

0.15730,0.19260,0.00000,0.05665,0.07425,

0.09425,0.11845,0.14785,0.17940,0.00000,

0.05570,0.07075,0.09350,0.12200,0.14710,

0.18255,0.00000,0.05110,0.05970,0.07910,

0.10330,0.14670,0.18145,0.00000,0.05394,

0.06228,0.08030,0.10030,0.11990,0.16590,

3XT,0,.4,.6,.8,.9,

3XT,5=,1,1.2,1.5,1.7,2,

3XT,10=,2.75,4,

3YT,0.,10472.,13963.,17453.,20944,

3YT,5=,.24435,.27925,

3AK,12,7,2,2,

=80X,967,15,700,920,

SIDEN,10,CV(N,ALPHA) SEC 5

3ZT,0.,0965,1211,1448,1702,

.197,.2306,0.,0977,.1232,

.1452,.1731,.2003,.2347,0,

.1003,.1267,.1492,.176,.206,

.2413,0.,1086,.1369,

0.16140,0.19235,0.22250,0.26090,0.00000,

0.11765,0.15210,0.17060,0.19690,0.22200,

0.23350,0.00000,0.09180,0.12495,0.15795,

0.17215,0.19990,0.21530,0.00000,0.11820,

0.14695,0.16280,0.17945,0.16735,0.16055,

0.00000,0.12040,0.13380,0.14940,0.17140,

0.19040,0.23880,0.00000,0.08965,0.11440,

0.14200,0.16795,0.20140,0.23385,0.00000,

0.06100,0.09315,0.12945,0.15035,0.19330,

0.24050,0.00000,0.08040,0.11145,0.15290,

0.20330,0.26000,0.32160,0.00000,0.08488,

0.11627,0.15520,0.19740,0.21260,0.29200,

3XT,0.,4.,6.,8.,9,

3XT,5=,1,1.2,1.5,1.7,2,

3XT,10=,2.75,4,

3YT,0.,10472.,13963.,17453.,20944,

3YT,5=,.24435,.27925,

3AK,12,7,2,2,

=80X,968,15,700,921,

SIDEN,10,CN(M,ALPHA) SEG 6

32T,0,.003275,.01403,.01722,.02638,

.03795,.05715,0,.00841,.01428,

.01782,.07682,.0346,.0581,0,

.00865,.01466,.0131,.02758,.03962,

.0597,0,.00935,.01585,

0.01980,0.02480,0.04290,0.06460,0.00000,

0.01380,0.02680,0.01965,0.02870,0.03965,

0.04295,0.00000,-.00090,-.00360,0.01100,

0.00675,0.01850,0.02911,0.00000,-.03800,

-.04705,-.03875,-.01065,-.01380,0.01915,

0.00000,0.02295,-.01520,-.00900,0.00030,

0.03060,0.05565,0.00000,0.00775,0.01155,

0.01330,0.02795,0.04925,0.08905,0.00000,

0.02225,0.01895,0.02770,0.04145,0.06775,

0.10555,0.00000,0.01855,0.03455,0.04780,

0.06360,0.08185,0.10120,0.00000,0.01958,

0.03604,0.04850,0.06170,0.06690,0.09220,

3XT,0,.4,.6,.8,.9,

3XT,5=,1,1.2,1.5,1.7,2,

3XT,10=,2.75,4,

3YT,0,.10472,.13963,.17453,.20944,

3YT,5=,.24435,.27925,

3AK,12,7,2,2,

=BUX,969,15,700,925,

SIDEN,10,CN(M,ALPHA) SEG 7

32T,0,.00981,.014,.0177,.0222,

.03344,.0417,0,.00999,.01422,

.018,.0226,.03402,.0424,0,

.01028,.01461,.0185,.0232,.03496,

.04358,0,.0111,.0158,

0.02000,0.02510,0.03780,0.04710,0.00000,

-0.00900,-0.03330,-0.00405,0.01765,0.02575,

0.03980,0.00000,0.00095,0.01270,-.00655,

-.00340,0.00740,0.01495,0.00000,0.03245,

0.04960,0.05905,0.06590,0.09915,0.13190,

0.00000,0.01080,0.04130,0.05250,0.06560,

0.08170,0.09710,0.00000,0.02530,0.04015,

0.04840,0.06440,0.08075,0.10390,0.00000,

0.03170,0.03700,0.05035,0.06525,0.08295,

0.10585,0.00000,0.02535,0.03940,0.05180,

0.06745,0.08220,0.10167,0.00000,0.02676,

0.04110,0.05257,0.06550,0.07630,0.09260,

3XT,0,.4,.6,.8,.9,

3XT,5=,1,1.2,1.5,1.7,2,

3XT,10=,2.75,4,

3YT,0,.10472,.13963,.17453,.20944,

3YT,5=,.24435,.27925,

3AK,12,7,2,2,

=80X,970,15,700,926,

SIDEN,10,CN(M,ALPHA) SEG 8

3ZT,0,.03088,.0397,.0463,.05542,

.06245,.0702,0,.0314,.04035,

.0471,.0564,.06355,.0714,0,

.03228,.04145,.0484,.0579,.06526,

.0734,0,.0349,.0449,

0.05235,0.06260,0.07060,0.07940,0.00000,

0.03670,0.04610,0.05910,0.06400,0.07520,

0.08610,0.00000,0.03400,0.04185,0.05330,

0.06395,0.07070,0.08300,0.00000,0.03200,

0.04005,0.04885,0.05910,0.06795,0.09015,

0.00000,0.02525,0.03410,0.04375,0.05510,

0.06310,0.07655,0.00000,0.02470,0.03445,

0.04565,0.05780,0.07360,0.08655,0.00000,

0.02460,0.03380,0.04585,0.06060,0.07545,

0.08760,0.00000,0.02415,0.03335,0.04930,

0.06270,0.07690,0.09510,0.00000,0.02549,

0.03480,0.05000,0.06090,0.07170,0.08660,

3XT,0,.4,.6,.8,.9,

3XT,2=,1,1.2,1.5,1.7,2,

3XT,10=,2.75,4,

3YT,0,.10472,.13963,.17453,.20944,

3YT,5=,.24435,.27925,

3AK,12,7,2,2,

=BOX,971,15,700,936,

SIDEN,10,CN(M,ALPHA) SEG 9

3ZT,0,.0208,.02624,.03048,.03457,

.0400,.04395,0.02114,.0267,

.03102,.03518,.0407,.0447,0,

.02172,.0274,.03185,.03614,.0418,

.046,0,.0235,.02965,

0.03445,0.03905,0.04520,0.04970,0.00000,

0.02855,0.03610,0.04480,0.05240,0.05780,

0.05855,0.00000,0.01625,0.02670,0.03810,

0.04660,0.08175,0.11500,0.00000,0.01420,

0.01290,0.01530,0.02145,0.03490,0.04790,

0.00000,0.00950,0.01500,0.02220,0.03405,

0.04130,0.05450,0.00000,0.01320,0.02155,

0.02695,0.03560,0.04485,0.05315,0.00000,

0.01340,0.02190,0.02905,0.03585,0.04555,

0.05010,0.00000,0.01675,0.02140,0.03380,

0.04240,0.04540,0.05615,0.00000,0.01768,

0.02232,0.03430,0.04120,0.04190,0.05110,

3XT,0,.4,.6,.8,.9,

3XT,5=.1,1.2,1.5,1.7,2,

3XT,10=.2.75,4,

3YT,0,.10472,.13963,.17453,.20944,

3YT,5=.24435,.27925,

3AK,12,7,2,2,

=BOX,972,15,700,937,

SIDEN,10,CN(M,ALPHA) SEG 10

3ZT,0,-.00027,.00953,.00862,.0134,

.02325,.02143,0,-.00027,.0100,

.00877,.01362,.02366,.0218,0,

-.00028,.01028,.00902,.014,.0243,

.0224,0,-.0003,.0112,

0.00975,0.01515,0.02630,0.02420,0.00000,

-.00610,0.00960,0.01785,0.00856,0.01465,

0.02340,0.00000,0.00525,0.00970,0.01040,

0.01940,0.01010,0.01215,0.00000,0.00650,

0.01210,0.02255,0.03650,0.05460,0.07470,

0.00000,0.00550,0.01090,0.01995,0.02860,

0.03550,0.04100,0.00000,0.00855,0.01270,

0.01900,0.02630,0.03520,0.04080,0.00000,

0.01350,0.01510,0.01845,0.02480,0.03060,

0.03555,0.00000,0.01000,0.01270,0.01825,

0.02215,0.02660,0.02795,0.00000,0.01056,

0.01325,0.01852,0.02150,0.02510,0.02550,

3XT,0,.4,.6,.8,.9,

3XT,5=.1,1.2,1.5,1.7,2,

3XT,10=.2.75,4,

3YT,0,.10472,.13963,.17453,.20944,

3YT,5=.24435,.27925,

3AK,12,7,2,2,

=BOX,973,15,700,941,

SIDEN,10,CN(M,ALPHA) SEG 11

3XT,0,.02593,.03035,.03468,.03895,

.0434,.0469,0,.02635,.03085,

.03528,.0396,.0441,.0477,0,

.0271,.0317,.03625,.0407,.0453,

.049,0,.0293,.0343,

0.03920,0.04400,0.04900,0.05300,0.00000,

0.03110,0.03650,0.04100,0.04500,0.04980,

0.05400,0.00000,0.03100,0.03550,0.04070,

0.04500,0.04980,0.05400,0.00000,0.03150,

0.03880,0.04400,0.04800,0.05260,0.05700,

0.00000,0.03350,0.04120,0.04720,0.05200,

0.05630,0.05900,0.00000,0.03300,0.04100,

0.04600,0.05350,0.05760,0.06200,0.00000,

0.03050,0.03890,0.04600,0.05100,0.05760,

0.06300,0.00000,0.02550,0.03440,0.04250,

0.05000,0.05800,0.07174,0.00000,0.02692,

0.03589,0.04313,0.04850,0.05400,0.06530,

3XT,0,.4,,6,.8,.9,

3XT,5=,1,1.2,1.5,1.7,2,

3XT,10=,2.75,4,

3YT,0,.10472,.13963,.17453,.20944,

3YT,5=,.24435,.27925,

3AK,12,7,2,2,

=BOX,974,15,700,942,

SIDEN,10,MODE SLOPE, SEGMENT ZERO

3XT,.97,1.1,1.2,1.3,1.4,1.5,

3XT,6=,1.76,1.8,2.0,2.2,2.4,2.6,

3XT,12=,2.8,2.9,

3YT,-5.6,-4.88,-4.67,-4.54,-4.47,-4.43,

3YT, 6=, -4.43, -4.45, -4.54, -4.62, -4.7, -4.75,

3YT, 12=, -4.18, -4.17,

=80X, 975, 14, 905, 14, 2,

SIDEN, 10, MODE SLOPE, SEG. ONE

3XT, .97, 1.1, 1.2, 1.3, 1.4, 1.5,

3XT, 6=, 1.6, 1.7, 1.8, 1.9, 2.0, 2.2,

3XT, 12=, 2.4, 2.6, 2.8, 2.9,

3YT, -5.6, -4.84, -4.61, -4.5, -4.45, -4.43,

3YT, 6=, -4.44, -4.49, -4.6, -4.74, -4.86, -4.99,

3YT, 12=, -5.08, -5.14, -5.2, -5.23,

=80X, 976, 14, 905, 16, 2,

SIDEN, 10, MODE SLOPE, SEG. TWO

3XT, .97, 1.0, 1.1, 1.2, 1.4, 1.6,

3XT, 6=, 1.7, 1.8, 2.0, 2.2, 2.4, 2.9,

3YT, -4.4, -4.25, -4.0, -3.8, -3.4, -3.0,

3YT, 6=, -2.95, -2.9, -2.95, -2.95, -2.95,

=80X, 977, 14, 905, 11, 2,

SIDEN, 10, MODE SLOPE, SEG THREE

3XT, .97, 1.0, 1.1, 1.2, 1.4, 1.6,

3XT, 6=, 1.8, 2.0, 2.2, 2.3, 2.4, 2.65,

3XT, 12=, 2.9,

3YT, -1.6, -1.25, -.9, -.7, -.35, -.1,

3YT, 6=, .15, .4, .6, .7, .85,

3YT, 12=, .3,

=80X, 978, 14, 905, 13, 2,

SIDEN, 10, MODE SLOPE, SEG. FOUR

3XT, .97, 1.0, 1.1, 1.2, 1.4, 1.6,

3XT, 6=, 2.0, 2.4, 2.9,

3YT, .6, .9, 1.3, 1.55, 1.9, 2.2,

3YT, 6=, 2.6, 2.9, 3.15,

=80X, 979, 14, 905, 9, 2,

SIDEN,10,MODE SLOPE, SEG. FIVE

3XT,.97,1.0,1.1,1.2,1.4,1.6,

3XT,6=,2.0,2.4,2.9,

3YT,3.5,3.9,4.3,4.55,4.9,5.2,

3YT,6=,5.7,6.0,6.2,

=BOX,980,14,905,9,2,

SIDEN,10,MODE SLOPE, SEG. SIX

3XT,.97,1.0,1.06,1.2,1.4,1.6,

3XT,6=,2.0,2.4,2.9,

3YT,7.7,8.1,8.35,8.7,9.0,9.2,

3YT,6=,9.4,9.5,9.62,

=BOX,981,14,905,9,2,

SIDEN,10,MODE SLOPE, SEG. SEVEN

3XT,.97,1.05,1.2,1.4,1.6,1.98,

3XT,6=,2.2,2.4,2.9,

3YT,11.75,12.2,12.6,12.95,13.05,13.1,

3YT,6=,13.2,13.35,13.9,

=BOX,982,14,905,9,2,

SIDEN,10,MODE SLOPE, SEG. EIGHT

3XT,.97,1.0,1.05,1.1,1.2,1.3,

3XT,6=,1.6,1.7,1.8,1.85,2.0,2.2,

3XT,12=,2.3,2.5,2.7,2.9,

3YT,18.8,18.85,18.85,18.75,18.5,18.5,

3YT,6=,19.5,19.65,19.7,19.7,19.45,19.1,

3YT,12=,19.05,19.15,19.3,19.55,

=BOX,983,14,905,16,2,

SIDEN,10, MODE SLOPE, SEG9

3XT,.97,1.0,1.05,1.1,1.2,1.3,

3XT,6=,1.58,1.7,2.0,2.2,2.3,2.5,

3XT,12=,2.9,

3YT,25.45,25,24.8,24.75,24.85,25.1,

3Y1,6=,25.7,24.65,25.1,24.85,24.15,24.75,

3YT,12=,24.1,

=BOX,984,14,905,13,2,

5IDEN,10, MODE SLOPE, SEG 10

3XT,.97,1.5,2.0,2.5,2.9,

3YT,29.8,29.4,29.0,28.7,28.4,

=BOX,985,14,905,5,1,

5IDEN,10, MODE SLOPE, LES +CM

3XT,.97,1.5,2.0,2.5,2.9,

3YT,32.4,31.8,31.3,30.8,30.4,

=BOX,986,14,905,5,2,

5IDEN,10, MODE DISPL GIMBAL PT, M-1

3XT,.978,1.056,1.19,1.3238,1.457,1.585,

3XT,6=,1.722,1.853,1.885,2.147,2.247,2.378,

3XT,12=,2.509,2.64,2.77,2.9,

3YT,.1,..13,..105,..10,..09,..025,

3YT,6=,.087,..09,..09,..09,..095,..095,

3YT,12=,.1,.1,.1,.1,

=BOX,987,14,905,..6,2,

5IDEN,10, MODE DISPL SEG ZERO, MODE 1

3XT,.978,1.056,1.19,1.3238,1.457,1.585,

3XT,6=,1.722,1.853,1.885,2.147,2.247,2.378,

3XT,12=,2.509,2.64,2.77,2.9,

3YT,.15,..12,..10,..0 ..085,..08..

3YT,6=,.08,..08,..08,..08,..08,..08,

3YT,12=,.085,..09,..09,..095,

=BOX,988,14,905,16,2,

5IDEN,10, MODE DISPL SEG ONE, M-1

3XT,.978,1.056,1.19,1.3238,1.457,1.585,

3XT,6=,1.722,1.853,1.885,2.147,2.247,2.378,

3XT,12=,2.509,2.64,2.77,2.9,

3YT,.10,.075,.055,.05,.045,.04,

3YT₁₆=,.04,.04,.04,.04,.045,

3YT,12=,.045,.05,.05,.05,

=80X,989,14,905,16,2,

SIDEN,10,MODE DISPL SEG TWO, M-1

3XT,.978,.056,1.19,1.3238,1.457,1.585,

3XT,6=,1.722,1.853,1.885,2.147,2.247,2.378,

3XT,12=,2.509,2.64,2.77,2.9,

3YT,-.005,-.02,-.03,-.035,-.04,-.04,

3YT,6=,-.04,-.04,-.04,-.04,-.045,-.045,

3YT,12=,-.045,-.045,-.04,-.04,

=80X,990,14,905,16,2,

SIDEN,1C,MODE DISPLAY SEG 3, M-1

3XT,.978,1.056,1.19,1.3238,1.457,1.585,

3XT,6=,1.722,1.853,1.885,2.147,2.247,2.378,

3XT,12=,2.509,2.64,2.77,2.9,

3YT,-.05,-.055,-.06,-.06,-.06,-.06,

3YT,6=,-.06,-.06,-.06,-.06,-.06,-.06,

3YT,12=,-.06,-.06,-.06,-.06,

=80X,991,14,905,16,2,

SIDEN,1D,MODE DISPLAY SEG 4, M-1

3XT,.978,1.056,1.19,1.3238,1.457,1.585,

3XT,6=,1.722,1.853,1.885,2.147,2.247,2.378,

3XT,12=,2.509,2.64,2.77,2.9,

3YT,-.06,-.06,-.06,-.06,-.055,-.055,

3YT,6=,-.055,-.05,-.05,-.05,-.05,-.045,

3YT,12=,-.04,-.038,-.035,-.035,

=80X,992,14,905,16,2,

SIDEN,10,MODE DISPLAY SEG 5, M-1

3XT,.978,1.056,1.19,1.3238,1.457,1.585,

3XT,6=,1.722,1.853,1.885,2.147,2.247,2.378,

3XT,12=,2.509,2.64,2.77,2.9,

3YT,-.045,-.045,-.04,-.035,-.035,-.03,

3YT,6=,-.03,-.03,-.03,-.025,-.02,-.02,

3YT,12=,-.01,-.005,0,0,

=BOX,993,14,905,16,2,

SIDEN,10,MODE DISPL SEG 6, M-1

3XT,.978,1.056,1.19,1.3238,1.457,1.585,

3XT,6=,1.722,1.853,1.885,2.147,2.247,2.378,

3XT,12=,2.509,2.64,2.77,2.9,

3YT,,-.005,.005,.01,.015,.02,.02,

3YT,6=,.025,.025,.025,.035,.04,.045,

3YT,12=,.045,.05,.06,.06,

=BOX,994,14,905,16,2,

SIDEN,10,MODE DISPL SEG 7, M-1

3XT,.978,1.056,1.19,1.3238,1.457,1.585,

3XT,6=,1.722,1.853,1.885,2.147,2.247,2.376,

3XT,12=,2.509,2.64,2.77,2.9,

3YT,.,05,.065,.08,.085,.09,.095,

3YT,6=,.095,.095,.10,.105,.12,.12,

3YT,12=,.12,.125,.13,.14,

=BOX,995,14,905,16,2,

SIDEN,10,MODE DISPL SEG 8, M-1

3XT,.978,1.056,1.19,1.3238,1.457,1.585,

3XT,6=,1.722,1.853,1.885,2.147,2.247,2.378,

3XT,12=,2.509,2.64,2.77,2.9,

3YT,.,17,.16,.16,.17,.175,.18,

3YT,6=,.18,.19,.19,.195,.2,.21,

3YT,12=,.215,.22,.225,.23,

=BOX,996,14,905,16,2,

SIDEN,10,MODE DISPL SEG 9, M-1

3XT,.978,1.056,1.19,1.3238,1.457,1.585,

3XT,6=,1.722,1.853,1.865,2.147,2.247,2.378,

3XT,12=,2.509,2.64,2.77,2.9,

3YT,.25,.25,.26,.265,.27,.28,

3YT,6=,.25,.265,.29,.30,.305,.305,

3YT,12=,.305,.315,.32,.33,

=BX,997,14,905,16,2,

SIDEN,10,MODE DISPL SEG 10, M-1

3XT,.978,1.056,1.19,1.3238,1.457,1.585,

3XT,6=,1.722,1.853,1.885,2.147,2.247,2.378,

3XT,12=,2.509,2.64,2.77,2.9,

3YT,.33,.345,.355,.36,.36,.37,

3YT,6=,.375,.375,.375,.39,.395,.4,

3YT,12=,.405,.41,.415,.42,

=BX,998,14,905,16,2,

SIDEN,10,MODE DISPL SEG 11, M-1

3XT,.978,1.056,1.19,1.3238,1.457,1.585,

3XT,6=,1.722,1.853,1.865,2.147,2.247,2.378,

3XT,12=,2.509,2.64,2.77,2.9,

3YT,.42,.43,.44,.45,.45,.455,

3YT,6=,.46,.46,.46,.465,.47,.47,

3YT,12=,.47,.47,.48,.48,

=BX,999,14,905,16,2,

=BX,1000,7,1001,0,,1,

=BX,1001,7,1004,0,,1,

=BX,1002,11,1001,1017,

=BX,1003,11,1016,1000,

=BX,1004,9,1003,1002,1005,-1,-02,

=BX,1005,13,1007,1006,

=BX,1006,12,905,-7938.3,6671,5217.4,-911.4,-1.2,

=BX,1007,13,1008,771,,,79.46,1009,-401,

=BX,1008,9,1010,1011,,, -1,-1,

=80X,1009,9,1012,1018,1019,1020,
=80X,1010,11,803,418,.,.,1088,
=80X,1011,11,807,403,.,.,1088,
=80X,1012,9,1013,1014,1015,
=80X,1013,13,963,-1088,.,.,964,-1089,
=80X,1014,13,965,-1090,.,.,966,-1091,
=80X,1015,13,967,-1092,.,.,968,-1093,
=80X,1016,11,1017,1017,
=80X,1017,12,905,-5.391,15.86,4.554,-2.05,.32,
=80X,1018,13,969,-1094,.,.,70,-1095,
=80X,1019,13,971,-1096,.,.,972,-1097,
=80X,1020,13,973,-1098,.,.,974,-1099,
=80X,1021,11,1076,1000,.001,
=80X,1022,11,1077,1000,.001,
=80X,1023,11,1078,1000,.001,
=80X,1024,11,1079,1000,.001,
=80X,1025,11,1080,1000,.001,
=80X,1026,11,1081,1000,.001,
=80X,1027,11,1082,1000,.001,
=80X,1028,11,1083,1000,.001,
=80X,1029,11,1084,1000,.001,
=80X,1030,11,1085,1000,.001,
=80X,1031,11,1086,1000,.001,
=80X,1032,11,1087,1000,.001,
5IDEN,10,MODE SLOPE SEG 0, MODE 2
3XT,1,1.3,1.5,1.6,1.7,1.9,
3XT,6=,2.1,2.2,2.3,2.4,2.5,2.7,
3XT,12=,2.9,
3YT,2.96,2.88,2.92,3.04,3.3,3.97,
3YT,6=,4.3,4.27,4.17,3.96,3.62,3.46,
3YT,12=,3.44,

=80X,1076,14,905,13,/,

SIDEN,10,MODE SLOPE SEG 1, MODE 2

3XT,1,1.3,1.5,1.6,1.7,1.9,

3YT,6=,2.1,2.2,2.3,2.4,2.5,2.7,

3XT,12=,2.9,

3YT,3.2,3.28,3.39,3.54,3.82,4.4,

3YT,6=,4.68,4.72,4.66,4.56,4.4,4.06,

3YT,12=,3.94,

=80X,1077,14,905,13,2,

SIDEN,10,MODE SLOPE SEG 2, MODE 2

3XT,.9,2,2.25,2.6,2.9,

3YT,1.44,-.1,-.48,-.8,-1.08,

=80X,1078,14,905,5,2,

SIDEN,10,MODE SLOPE SEG 3, MODE 2

3XT,.9,2,2.25,2.6,2.9,

3YT,-2.2,-3.58,-3.04,-3.93,-4.4,

=80X,1079,14,905,5,2,

SIDEN,10,MODE SLOPE SEG 4, MODE 2

3XT,.9,2.9,

3YT,-4.16,-4.4,

=80X,1080,14,905,2,2,

SIDEN,10,MODE SLOPE SEG 5, MODE 2

3XT,.9,2.9,

3YT,-6,-4.88,

=80X,1081,14,905,2,2,

SIDEN,10,MODE SLOPE SEG 6, MODE 2

3XT,.9,2.9,

3YT,-4.5,-.2,

=80X,1082,14,905,2,2,

SIDEN,10,MODE SLOPE SEG 7, MODE 2

3XT,.9:2.9,

3YT,-2.88,3,

=BX,1083,14,905,2,2,

>IDEN,10,MODE SLOPE SEG 8, MODE 2

3XT,.9,2.9,

3YT,2.44,13,

=BX,1084,14,905,2,2,

>IDEN,10,MODE SLOPE SEG 9, MODE 2

3XT,.97,1.8,2.7,2.5,2.9,

3YT,8.2,13.9,16.2,17,17.6,

=BX,1085,14,905,5,2,

>IDEN,10,MODE SLOPE SEG 10, MODE 2

3XT,.9,1.6,2.1,2.5,2.9,

3YT,20.55,23.45,25.2,26.25,27.15,

=BX,1086,14,905,5,2,

>IDEN,10,MODE SLOPE SEG 11,MODE 2

3XT,.9,1.6,2.1,2.5,2.9,

3YT,29.25,31.1,32.9,33.6,33.6,

=BX,1087,14,905,5,2,

>IDEN,10,MODE DISPLAY SEG 0, MODE 2

3XT,.972,1.056,1.19,1.3238,1.457,1.585,

3XT,6=,1.722,1.853,1.985,2.1147,2.247,2.378,

3XT,12=,2.509,2.64,2.77,2.9,

3YT,-.06,-.05,-.05,-.05,-.05,-.05,

3YT,6=,-.06,-.065,-.065,-.07,-.07,-.07,

3YT,12=,-.07,-.067,-.066,-.063,

=BX,1088,14,905,16,2,

>IDEN,10,MODE DISPLAY SEG 1, MODE 2

3XT,.972,1.056,1.19,1.3238,1.457,1.585,

3XT,6=,1.722,1.853,1.985,2.1147,2.247,2.378,

3XT,12=,2.509,2.64,2.77,2.9,

3YT,-.025,-.02,-.02,-.02,-.02,-.015,

3YT,6=-.02,-.02,-.02,-.02,-.025,-.03,

3YT,12=-.03,-.025,-.025,-.03,

=BOX,1089,14,905,16,2,

SIDEN,10,MODE DISPL SEG 2, MODE 2

3XT,.972,1.056,1.19,1.3238,1.457,1.585,

3XT,6=,1.722,1.853,1.985,2.1147,2.247,2.378,

3XT,12=,2.509,2.64,2.77,2.9,

3YT,.025,.03,.03,.025,.03,.03,

3YT,6=,.025,.025,.025,.025,.03,.02,

3YT,12=,.02,.02,.02,.02,

=BOX,1090,14,905,16,2,

SIDEN,10,MODE DISPL SEG 3, MODE 2

3XT,.972,1.056,1.19,1.3238,1.457,1.585,

3XT,6=,1.722,1.853,1.985,2.1147,2.247,2.378,

3XT,12=,2.509,2.64,2.77,2.9,

3YT,.03,.03,.025,.025,.025,.02,

3YT,6=,.02,.01,.01,.005,0,-.005,

3YT,12=,-.01,-.01,-.01,-.015,

=BOX,1091,14,905,16,2,

SIDEN,10,MODE DISPL SEG 4, MODE 2

3XT,.972,1.056,1.19,1.3238,1.457,1.585,

3XT,6=,1.722,1.853,1.985,2.1147,2.247,2.378,

3XT,12=,2.509,2.64,2.77,2.9,

3YT,-.005,-.005,-.01,-.01,-.015,-.02,

3YT,6=,-.025,-.035,-.035,-.035,-.04,-.05,

3YT,12=,-.05,-.05,-.055,-.05,

=BOX,1092,14,905,16,2,

SIDEN,10,MODE DISPL SEG 5, MODE 2

3XT,.972,1.056,1.19,1.3238,1.457,1.585,

3XT,6=,1.722,1.853,1.985,2.1147,2.247,2.378,

3XT,12=,2.509,2.64,2.77,2.9,

3YT,-.045,-.045,-.05,-.05,-.06,-.06,

3YT,6=,-.065,-.07,-.075,-.08,-.08,-.085,

3YT,12=,.005,-.055,-.085,-.09,

=BOX,1093,14,905,16,2,

5IDEN,10,MODE DISPL SEG 6, MODE 2

3XT,.972,1.056,1.19,1.3238,1.457,1.585,

3XT,6=,1.722,1.853,1.985,2.1147,2.247,2.378,

3XT,12=,2.509,2.64,2.77,2.9,

3YT,-.075,-.08,-.08,-.085,-.09,-.09,

3YT,6=,-.09,-.1,-.1,-.1,-.105,-.105,

3YT,12=,-.103,-.103,-.105,-.11,

=BOX,1094,14,905,16,2,

5IDEN,10,MODE DISPL SEG 7, MODE 2

3XT,.972,1.056,1.19,1.3238,1.457,1.585,

3XT,6=,1.722,1.853,1.985,2.1147,2.247,2.378,

3XT,12=,2.509,2.64,2.77,2.9,

3YT,-.1,-.1,-.1,-.11,-.11,-.11,

3YT,6=,-.11,-.11,-.11,-.11,-.105,-.105,

3YT,12=,-.103,-.105,-.105,-.105,

=BOX,1095,14,905,16,2,

5IDEN,10,MODE DISPL SEG 8, MODE 2

3XT,.972,1.056,1.19,1.3238,1.457,1.585,

3XT,6=,1.722,1.853,1.985,2.1147,2.247,2.378,

3XT,12=,2.509,2.64,2.77,2.9,

3YT,-.11,-.11,-.11,-.1,-.1,-.1,

3YT,6=,-.1,-.09,-.09,-.09,-.08,-.075,

3YT,12=,-.075,-.075,-.07,-.07,

=BOX,1096,14,905,16,2,

5IDEN,10,MODE DISPL SEG 9, MODE 2

3XT,.972,1.056,1.19,1.3238,1.457,1.585,

3XT,6=,1.722,1.853,1.985,2.1147,2.247,2.378,

3XT,12=,2.509,2.64,2.77,2.9,
3YT,-.08,-.08,-.075,-.07,-.065,-.06,
3YT,6=,-.06,-.05,-.04,-.03,-.025,-.02,
3YT,12=,-.02,-.02,-.03,-.01,
=BOX,1097,14,905,16,2,
S1DEN,10,MODE DISPL SEG 10,MODE 2
3XT,.972,1.056,1.19,1.3233,1.457,1.585,
3XT,6=,1.722,1.853,1.985,2.1147,2.247,2.378,
3XT,12=,2.509,2.64,2.77,2.9,
3YT,-.03,-.025,-.01,-.01,-.01,0,
3YT,6=,.01,.02,.02,.035,.05,.06,
3YT,12=,.05,.05,.07,.07,
=BOX,1098,14,905,16,2,
S1DEN,10,MODE DISPL SEG 11,MODE 2
3XT,.972,1.056,1.19,1.3238,1.457,1.585,
3XT,6=,1.722,1.853,1.985,2.1147,2.247,2.378,
3XT,12=,2.509,2.64,2.77,2.9,
3YT,.04,.05,.06,.06,.07,.09,
3YT,6=,.09,.1,.12,.13,.14,.15,
3YT,12=,.15,.15,.16,.17,
=BOX,1099,14,905,16,2,
=BOX,1100,9,1101,1107,
=BOX,1101,13,1199,-401,79.46/-5,,79.46/-6,1102,-401,
=BOX,1102,9,967,1103,966,,20,20,20,
=BOX,1103,9,970,969,968,1104,
=BOX,1104,9,974,973,972,971,
=BOX,1105,9,1160,1106,1100,
=BOX,1106,13,965,-401,1589.2/-6,,79.46/-6,1102,-401,
=BOX,1107,11,1108,401,79.46/-6,
=BOX,1108,9,1109,973,1191,974,1,50,10,54.15,
=BOX,1109,9,1110,1193,972,1192,1,10,46,10,

=BOX,1110,9,1111,970,1194,971,1,35,10,41,
=BOX,1111,9,1112,1196,969,1195,1,10,28,10,
=BOX,1112,9,1198,967,1197,968,10,13,10,21,
=BOX,1113,13,1114,-403,,,1115,-418,
=BOX,1114,13,1116,771,,,1121,-617,
=BOX,1115,13,1117,771,,,1121,-622,
=BOX,1116,13,1119,-613,,,1120,-614,
=BOX,1117,13,1119,-613,,,1120,-621,
=BOX,1118,13,644,-403,,,1,636,-418,
=BOX,1119,9,130,202,,,1,
=BOX,1120,9,131,213,,,1,
=BOX,1121,9,132,221,,,1,
=BOX,1122,9,1123,1134,1137,1100,1/-6,1.00225,.627922,
=BOX,1123,9,1124,1149,1128,1131,,555212,702477,706856,
=BOX,1124,9,1152,1140,1143,1146,,1581037,2003423,3561210,
=BOX,1125,9,1126,1134,1137,1107,1/-6,.722131,.465135,
=BOX,1126,9,1127,1149,1128,1131,,359653,479656,501490,
=BOX,1127,9,1157,1140,1143,1146,1970262,720375,1146527,2123270,
=BOX,1128,9,1129,1118,1130,1113,-1,83.053,-1,
=BOX,1129,11,1118,795,
=BOX,1130,13,996,-902,,,1096,-1004,
=BOX,1131,9,1129,1118,1133,1113,-1,88.839,-1,
=BOX,1133,13,997,-902,,,1097,-1004,
=BOX,1134,9,1129,1118,1136,1113,-1,91.559,-1,
=BOX,1136,13,998,-902,,,1098,-1004,
=BOX,1137,9,1129,1118,1139,1113,-1,97.146,-1,
=BOX,1139,13,999,-902,,,1099,-1004,
=BOX,1140,9,1129,1118,1142,1113,-1,56.74,-1,
=BOX,1142,13,992,-902,,,1092,-1004,
=BOX,1143,9,1129,1118,1145,1113,-1,66.76,-1,
=BOX,1145,13,993,-902,,,1093,-1004,

=BOX,1146,9,1129,1118,1148,1113,-1,69.532,-1,

=BOX,1148,13,994,-902,,,1094,-1004,

=BOX,1149,9,1129,1118,1151,1113,-1,76.782,-1,

-BOX,1151,13,995,-902,,,1095,-1004,

=BOX,1152,13,1153,-1124,,,10615551,1157,771,

=BOX,1153,13,1139,-1190,,,20,1189,771,

=BOX,1154,9,1156,1155,1113,-1,

=BOX,1155,13,1118,-1190,,,1118,-795,

=BOX,1156,13,990,-902,,,1090,-1004,

=BOX,1157,9,1129,1118,1159,1113,-1,44.558,-1,

=BOX,1159,13,991,-902,,,1091,-1004,

=BOX,1160,13,963,-401,8.82006/-5,,,79.46/-5,1188,-401,

SIDEN,10,CN X CP(M,ALPHA) SEG 1

3ZT,0,.0347,.04,.067,.089,

.1267,.2,0,.0347,.04,

.067,.089,.1267,.2,0,

.025,.05689,.08096,.11883,.1429,

.1859,0,.004,.00,0.08,

.114,.16,.22,0,.021,

.035,.048,.1,.15996,.21995,

0,.008,.014,.04,.1,

.14597,.23595,0,.004,.028,

.046,.10398,.18,.28,0,

.002,.038,.073,.138,.22,

.322,0,.01,.06,.12,

.19594,.27593,.33732,0,.01056,

.06258,.12223,.19018,.25694,.3072,

3XT,0,.8,.5,1,1.2,

3XT,5=,1.,1.,1./,2.,2.,75,4,

3YT,0,.10472,.13963,.17453,.20944,

3YT,5=,.24435,.27925,

3AK,10,7,

=80X,1188,15,700,916,

SIDEN,10, SEG.2 MASS= F(M)

3XT,.917775,2.900505,

3YT,35903,1412954,

=80X,1189,14,905,2,

SIDEN,10, SEG.2 CG = F(M)

3XT,.917775,.962301,.988493,1.014684,1.067068,1.119452,

3XT,6=,1.171836,1.276604,1.381372,1.590907,1.748059,2.376666,

3XT,12=,2.900505,

3YT,32.0722,26.0792,24.5,23.65,22.6805,22.125,

3YT,6=,21.8941,21.7173,21.7887,22.2174,22.6736,24.8448,

3YT,12=,26.7775,

=80X,1190,14,905,13,

SIDEN,10,CN X XCP(M,ALPHA) SEG 10

3ZT,0,-.00092,0.00064,-.00011,0.00019,

0.00210,0.00141,0,-.00092,0.00064,

-.00011,0.00019,0.00210,0.00141,0.00000,

-.00329,0.00089,0.00031,-.00232,-.00117,

0.00023,0.00000,0.00142,0.00246,0.00255,

0.00356,-.00100,-.00324,0.00000,0.00056,

0.00150,0.00319,0.00543,0.00812,0.01130,

0.00000,0.00066,0.00134,0.00261,0.00391,

0.00497,0.00575,0.00000,0.00114,0.00162,

0.00262,0.00362,0.00505,0.00589,0.00000,

0.00139,0.00203,0.00252,0.00344,0.00428,

0.00495,0.00000,0.00140,0.00182,0.00257,

0.00341,0.00386,0.00472,0.00000,0.00148,

0.00190,0.00262,0.00331,0.00359,0.00430,

3XT,0,.8,.9,1,1.2,

3XT,5=,1.5,1.7,2,2.75,4,

3YT,0,.10472,.13963,.17453,.20944,

3YT,5=,.24435,.27925,

3AK,10,7,2,2,

=80X,1191,15,700,941,

SIDEN,10,CN X_XCP(M,ALPH)

SEG 9

32T,0,0.00440,0.00130,0.00629,0.00736,

0.00862,0.00956,0,0.00440,0.00530,

0.00629,0.00716,0.00862,0.00956,0.00700,

0.0070,0.00701,0.00715,0.01066,0.01134,

0.01220,0.00000,0.00284,0.00513,0.00751,

0.00895,0.01715,0.02540,0.00000,0.00230,

0.00172,0.00231,0.00375,0.00676,0.00388,

0.00000,0.00156,0.00275,0.00429,0.00644,

0.00792,0.00298,0.00000,0.00240,0.00388,

0.00488,0.00654,0.00812,0.00972,0.00000,

0.00242,0.00400,0.0035,0.00631,0.00815,

0.00902,0.00000,0.00320,0.00373,0.00650,

0.00342,0.00816,0.00998,0.00000. J338,

0.00389,0.00662,0.00817,0.00760,0.00909,

3XT,0,.8,.9,1,1,2,

3XT,5=,1.5,1.7,2,2.75,4,

3YT,0,.10472,.13963,.17453,.20944,

3YT,5=,.24435,.27925,

3AK,10,7,2,2,

=80X,1192,15,700,937,

SIDEN,10,CN X_XCP(M,ALPHA) SEG 8

32T,0,0.00514,0.01064,0.01235,0.01480,

0.01666,0.01850,0,0.00814,0.01064,

0.01235,0.01480,0.01666,0.01850,0.00000,

0.00844,0.01056,0.01351,0.01450,0.01713,

0.01970,0.00000,0.00753,0.00910,0.01193.

0.01487,0.01690,0.02000,0.00000,0.00694,

0.00902,0.01109,0.01360,0.01218,0.04707,

0.00000,0.00552,0.00742,0.00967,0.01299,

0.01469,0.01880,0.00000,0.00564,0.00762,

0.01434,0.01384,0.01796,0.02051,0.00000,

0.00555,0.00755,0.01056,0.01442,0.01771,

0.02081,0.00000,0.00569,0.00786,0.01172,

0.01493,0.01818,0.02222,0.00000,0.00001,

0.00820,0.01194,0.01449,0.01693,0.02024,

3XT,0,.8,.9,1,1.2,

3XT,5=,1.5,1.7,2,2.75,4,

3YT,0,.10472,.13963,.17453,.20944,

3YT,5=: 24435,.27325,

3AK,10,7,2,2,

=80X,1193,15,700,936,

5IDEN,10,CN X XCP(M,ALPHA) SEG 7

3ZT,0,0.00525,0.00723,0.00880,0.01044,

0.01480,0.01796,0,0.00525,0.00723,

0.00890,0.01044,0.01480,0.01796,0.00000,

-0.00312,-0.01678,-0.00037,0.00769,0.01007,

0.01380,0.00000,0.00932,0.01309,0.00894,

0.00820,0.00810,0.00910,0.00000,0.01169,

0.01583,0.01929,0.02147,0.03059,0.04206,

0.00000,0.01018,0.01406,0.01738,0.02081,

0.02557,0.02953,0.00000,0.00838,0.01305,

0.01576,0.02044,0.02551,0.03274,0.00000,

0.00954,0.01207,0.01655,0.02081,0.02613,

0.03269,0.00000,0.00830,0.01262,0.01674,

0.02142,0.02644,0.03232,0.00000,0.00876,

0.01317,0.01706,0.02079,0.02462,0.02943,

3XT,0,.8,.9,1,1.2,

3XT,5=,1.5,1.7,2,2.75,4,

3YT,0,.10472,.13963,.17453,.20944,

3YT,5=,.24435,.27925,

3AK,10,7,2,2,

=BX,1194,15,700,926,

SIDEN,10,CN X XCP(M,ALPHA) SEG 6

3ZT,0,0.00169,0.00329,0.00422,0.00755,

0.01106,0.01549,0,0.00169,0.00328,

0.00422,0.00755,0.01106,0.01549,0.00000,

0.00195,0.00410,0.00366,0.00706,0.01065,

.0152,0,-2.7/-3,-4.99/-3,8/-5,

-0.00457,0.00256,0.00794,0.00000,-.00333,

-0.00190,-.00334,0.00099,0.00594,0.01358,

0.00000,0.00438,0.00378,0.00664,0.01071,

0.01813,0.02629,0.00000,0.00508,0.00810,

0.01040,0.01551,0.0172,0.03289,0.00000,

0.00879,0.00829,0.01345,0.01849,0.02541,

0.03792,0.00000,0.00719,0.01280,0.01715,

0.02320,0.02911,0.03559,0.00000,0.00755,

0.01335,0.01747,0.02252,0.02711,0.03241,

3XT,0,.8,.9,1,1.2,

3XT,5=,1.5,1.7,2,2.75,4,

3YT,0,.10472,.13963,.17453,.20944,

3YT,5=,.24435,.27925,

3AK,10,7,2,2,

=BX,1195,15,700,925,

SIDEN,10,CN X XCP(M,ALPHA) SEG 5

3ZT,0,0.03179,0.04200,0.04986,0.05872,

0.0771,0.08231,0,0.03179,0.04200,

0.04986,0.05872,0.06771,0.08231,0.00000,

0.03820,0.04845,0.05300,0.06026,0.06754,

0.06750,0.00060,0.02844,0.03883,0.05027,
0.05397,0.06200,0.06550,0.00000,0.03752,
0.05006,0.05774,0.05540,0.04775,0.04970,
0.00000,0.02310,0.03693,0.04315,0.04373,
0.05037,0.07404,0.00000,0.01932,0.02796,
0.03306,0.04276,0.05606,0.06637,0.00000,
0.01117,0.01963,0.03207,0.03665,0.05628,
0.07230,0.00000,0.02064,0.02972,0.04199,
0.05802,0.07422,0.09073,0.00000,0.02179,
0.03100,0.04278,0.05631,0.06911,0.08263,
3XT,0,.8,.9,1,1.2,
3XT,5=,1.0,1.7,2,2.75,4,
3YT,0,.10472,.13963,.17453,.20944,
3YT,5=,.24435,.27925,
3AK,10,7,2,2,
=80X,1196,15,700,921,
5IDEN,10,CN_X_XCP()",ALPHA) SEG 4
3ZT,0,-.01116,-.00392,-.00111,0.03675,
0.04392,0.05876,0,-.01116,-.00392,
-.00111,0.03675,0.04392,0.05876,0.00000,
0.00031,0.01208,0.02102,0.04331,0.06143,
0.08946,0.00000,0.04150,0.06039,0.08470,
0.10335,0.11273,0.13100,0.00000,0.02136,
0.03500,0.04454,0.05472,0.07269,0.09038,
0.00000,0.02193,0.03049,0.04105,0.04584,
0.05902,0.07383,0.00000,0.02167,0.02772,
1-u3364,u.04373,0.05797,0.07165,0.00000,
0.02002,0.02062,0.03524,0.04742,0.05772,
0.07346,0.00000,0.01984,0.02397,0.03173,
0.04100,0.05954,0.07279,0.00000,0.02095,
0.02501,0.03800,0.03979,0.05504,0.06629,

3XT,0,.8,.9,1,1.2,

3XT,5=.1.5,1.7,2,2.75,4,

3YT,0,.10472,.13963,.17453,.20944,

3YT,5=,.24435,.27925,

3AK,10,7,2,2,

=RUX,1197,15,700,920,

SIDEN,10,CN X XCP(M,ALPHA) SEG 3

3ZT,0,0.00873,0.01690,0.02535,0.02800,

0.03300,0.04167,0,0.00873,0.01690,

0.02535,0.02800,0.03300,0.04167,0.00000,

0.01386,0.00944,0.00664,0.02184,0.01900,

0.03988,0.00000,-.03570,-.03980,-.03628,

0.01730,0.00842,0.02230,0.00000,0.02460,

0.02588,0.04630,0.06484,0.08899,0.10015,

0.00000,0.03276,0.05627,0 4.0 09836,

0.12960,0.15212,0.00000 2.0 0.05088,

0.08636,0.10490,0.11444,2614,0.00000,

0.03741,0.06125,0.07932,0.10290,0.12393,

0.14050,0.00000,0.04183,0.05114,0.07643,

0.09796,0.13188,0.16120,0.00000,0.04416,

0.05335,0.07787,0.09508,0.12281,0.14681,

3XT,0,.8,.9,1,1.2,

3XT,5=.1.5,1.7,2,2.75,4,

3YT,0,.10472,.13963,.17453,.20944,

3YT,5=,.24435,.27925,

3AK,10,7,2,2,

=RUX,1198,15,700,931,

SIDEN,10,CN X XCP(M,ALPHA) SEG 2

3ZT,0,0.02530,0.0400,0.06000,0.08417,

0.09595,0.13920,0,0.02530,0.04000,

0.06000,0.08417,0.09595,0.13920,0.00000,

0.02030,0.03264,0.04640,0.07330,0.13350,

0.18560,0.00000,0.03241,0.04866,0.08020,

0.09806,0.14065,0.15730,0.00000,-.00040,

0.02652,0.04136,0.08484,0.10797,0.13724,

0.00000,0.00800,0.01400,0.04134,0.10030,

0.15246,0.23800,0.00000,0.00710,0.02600,

0.06285,0.11692,0.18065,0.26443,0.00000,

0.00409,0.04929,0.07337,0.13943,0.22000,

0.31822,0.00000,0.02601,0.06642,0.12098,

0.18840,0.27600,0.33740,0.00000,0.02746,

0.06929,0.12326,0.18486,0.25701,0.30727,

3XT,0.,.8,.9,1,1.2,

3XT,5=,1.5,1.7,2,2.75,4,

3YT,0.,.10472,.13963,.17453,.20944,

3YT,5=,.24435,.27925,

3AK,10,7,2,2,

=80X,1199,15,700,930,

3EMAX,3=,,,.1,

3EMAX,1/-3,1/-4,10,

3PRINTC,1/-3,PRINTD,1/-4,

4JUMP,4=,5, 1

=80X,-99,

8

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3.0 ADJOINT MODEL

The Adjoint Simulation Model of the combined vehicle-wind model system was used to obtain vehicle response statistics. This model uses the DYNASAR Algorithm, and was programmed for the IBM 7094 computer.

\$JOB C112 SHAW BIN 200 ,39,890,00,11,140E

\$EXECUTE SPARK

FORTRAN

*ID 35/P HOLMES BIN 32 ,360700,05,12,020E

* XEQ

1 J

3 P 0 7 7 3+L 0

* DATA

C 376 X X/ 7 2 23 7 3 3 = 85+ 5 -79 9 C
=31,X,0,

5NAME,10, ROWE GRAF DATE 1/18/69 CHARGE AERO

5ADDRESS,10, OF ASD BLDG S EXT 536-9791

5DEVENT,10, 5 DDF AS504 ADJOINT MODEL

3EXTRA,100,.1,

3EXTRA,5=,0,0,,100,

4NBUX,2=,643,,236,,645,,629,,350,,215,,641,,

4NBUX,16=,617,,1270,,640,,636,,517,,522,,639,,

4NBUX,30=,636,,907,,908,,913,,933,,934,,935,,

4NBUX,44=,936,,937,,938,,939,,940,,941,,942,,

4NBUX,58=,943,,944,,945,,1007,,1008,,1013,,1045-,

4NBUX,72=,1209,,1214,,1216,,1219,,1224,,1211,,1238,,

4NBUX,86=,1249,,1253,,1251,,1258,,1259,,502,,504,,

4NBUX,100=,301,,932,,624,,622,,656,,

=BX,-88,

=BX,10,24,703,700,701,701,

=BX,205,7,-629,0,1,1,,,244,

=BX,215,11,237,-796,

=BX,219,13,795,-215,5,,,498,-215,

=BX,236,24,703,205,700,700,

=BX,237,9,236,1253,

=BX,244,22,-6,703,629,

=CIX,301,7,-302,0,1,1,,,303,
=BIX,302,11,629,222,-1,
=BIX,303,22,-6,703,302,
=BIX,350,7,353,0,1,1,
=BIX,351,7,-354,0,1,1,,,354,
=BIX,352,7,-355,0,1,1,,,355,
=BIX,353,11,379,379,,,,,353,
=BIX,354,9,357,363,,,1,,1,,,
=BIX,355,7,356,361,360,,,,,
=BIX,356,11,629,389,-1,
=BIX,357,11,629,388,-1,
=BIX,359,11,704,1.17538,1.5105,.0583739,-.221665/-3,
=BIX,360,11,390,363,,,,,,
=BIX,361,11,362,391,,,,,,
=BIX,362,24,703,391,700,700,
=BIX,363,24,703,352,700,700,
=BIX,364,22,-6,703,354,
=BIX,365,22,-6,703,355,
=BIX,371,24,703,373,700,700,,,,
=BIX,373,7,-375,0.,1,1,,,374,
=BIX,374,22,-6,703,375,,,,,,
=BIX,375,9,376,377,,,,,,
=BIX,376,11,629,387,-1,,
=BIX,377,11,392,371,,,,,,
=BIX,379,9,371,362,,,,,,
510EN,10,32,387
3xT,0.,29.1915E,39.12125,46.27792,52.08059,
3xT,5=,57.05219,61.45172,65.42883,69.07888,
3xT,9=,72.46681,75.63909,79.63031,81.46693,84.1697,
3xT,14=,86.75553,89.23791,91.62784,
3xT,.197,.197,.139,.119,.102,.084,.08,.0765,.06,.0348,.0353,.0271..01 _____

3YT,13=,.0396,.0571,.0647,.0769,
=BOX,387,14,704,17,2,
5IDEN,10,81,30
3XT,0=,29.19158,39.12125,46.27792,52.08059,
3XT,5=,57.05219,61.45172,65.42883,69.07883,
3XT,9=,72.46681,75.63909,78.63031,81.46693,84.1697,
3XT,14=,86.75553,89.23781,91.62784,
3YT,-3.31/-8,-3.31/-8,-1.5777/-8,-3.1101/-8,3.6085/-8,
3YT,5=,9.7517/-7,-2.2475/-6,6.4204/-6,-1.9459/-5,2.9034/-5,
3YT,10=,4.4939/-5,-2.0808/-4,1.6252/-4,2.616/-4,-3.71/-4,2.054/-4,
3YT,15=,6.3603/-5,
=BOX,388,14,704,17,2,
5IDEN,10,80,389
3XT,0=,29.19158,39.12125,46.27792,52.08059,
3XT,5=,57.05219,61.45172,65.42883,69.07883,
3XT,9=,72.46681,75.63909,78.63031,81.46693,84.1697,
3XT,14=,86.75553,89.23781,91.62784,
3YT,-3.217/-5,-3.217/-5,-9.58/-6,-3.39/-6,-3.278/-5,-4.367/-5,
3YT,6=,.0006179,-1.789/-3,.00296,.00926,-.489/-1,.03518,
3YT,12=,.1225,-.10355,
3YT,14=,-6.558/-3,1.0706/-1,-1.02377/-1,
.=BOX,389,14,704,17,2,
5IDEN,10,A1,390
3XT,0=,0.10/+01,0.20/+01,0.30/+01,
3XT,4=,0.40/+01,0.50/+01,0.60/+01,0.70/+01,
3XT,8=,0.80/+01,0.90/+01,0.10/+02,0.11/+01,
3XT,12=,0.12/+02,0.13/+02,0.14/+02,0.15/+02,
3XT,16=,0.16/+02,0.17/+02,0.19/+02,0.19/+02,
3XT,20=,0.20/+02,0.21/+02,0.22/+02,0.23/+02,
3XT,24=,0.24/+02,0.25/+02,0.26/+02,0.27/+02,
3XT,28=,0.28/+02,0.29/+02,0.30/+02,0.31/+02,

3XT,32=,0.32/+02,0.33/+02,0.34/+02,0.35/+02,
3XT,36=,0.36/+02,0.37/+02,0.38/+02,0.39/+02,
3XT,40=,0.40/+02,0.41/+02,0.42/+02,0.43/+02,
3XT,44=,0.44/+02,0.45/+02,0.46/+02,0.47/+02,
3XT,48=,0.48/+02,0.49/+02,0.50/+02,0.51/+02,
3XT,52=,0.52/+02,0.53/+02,0.54/+02,0.55/+02,
3XT,56=,0.56/+02,0.57/+02,0.58/+02,0.59/+02,
3XT,60=,0.60/+02,0.61/+02,0.62/+02,0.63/+02,
3XT,64=,0.64/+02,0.65/+02,0.66/+02,0.67/+02,
3XT,68=,0.68/+02,0.69/+02,0.70/+02,0.71/+02,
3XT,72=,0.72/+02,0.73/+02,0.74/+02,0.75/+02,
3XT,76=,0.76/+02,0.77/+02,0.78/+02,0.79/+02,
3XT,80=,0.80/+02,0.81/+02,0.82/+02,0.83/+02,
3XT,84=,0.84/+02,0.85/+02,0.86/+02,0.87/+02,
3XT,88=,0.88/+02,0.89/+02,
3YT,.764,.467,.364,.220,
- 3YT,4=.240,.214,.195,.183,
- 3YT,8=.174,.169,.166,.164,
- 3YT,12=.165,.168,.172,.177,
- 3YT,16=.182,.189,.198,.207,
- 3YT,20=.217,.227,.238,.249,
- 3YT,24=.260,.270,.280,.289,
- 3YT,28=.296,.303,.306,.307,
- 3YT,32=.306,.300,.291-.277,
- 3YT,36=.259,.236,.208,.174,
- 3YT,40=.135,.0902,.0412,.-0125,
3YT,44=-.0704,-.132,-.180,-.238,
3YT,48=-.300,-.303,-.427,-.490,
3YT,52=-.564,-.6.3,-.672,-.709,
3YT,56=-.728,-.671,-.639,-.603,
3YT,60=-.568,-.551,-.549,-.538,

3Y1,64=-.532,-.540,-.556,-.565,
3Y1,68=-.567,-.546,-.528,-.513,
3Y1,72=-.510,-.527,-.527,-.513,
3Y1,76=-.430,-.366,-.363,-.442,
3Y1,80=-.432,-.362,-.198,-.0973,
3Y1,84=-.0160,.0325,.0574,.0534,
3Y1,88=.0798,.141,
=BUX,390,14,704,80,2,
10EN,10,10,391
3XT,0.,0.10/+01,0.20/+01,0.30/+01,
3XT,4=,0.40/+01,0.50/+01,0.60/+01,0.70/+01,
3XT,8=,0.80/+01,0.90/+01,0.10/+02,0.11/+01,
3XT,12=,0.12/+02,0.13/+02,0.14/+02,0.15/+02,
3XT,16=,0.16/+02,0.17/+02,0.18/+02,0.19/+02,
3XT,20=,0.20/+02,0.21/+02,0.22/+02,0.23/+02,
3XT,24=,0.24/+02,0.25/+02,0.26/+02,0.27/+02,
3XT,28=,0.28/+02,0.29/+02,0.30/+02,0.31/+02,
3XT,32=,0.32/+02,0.33/+02,0.34/+02,0.35/+02,
3XT,36=,0.36/+02,0.37/+02,0.38/+02,0.39/+02,
3XT,40=,0.40/+02,0.41/+02,0.42/+02,0.43/+02,
3XT,44=,0.44/+02,0.45/+02,0.46/+02,0.47/+02,
3XT,48=,0.48/+02,0.49/+02,0.50/+02,0.51/+02,
3XT,52=,0.52/+02,0.53/+02,0.54/+02,0.55/+02,
3XT,56=,0.56/+02,0.57/+02,0.58/+02,0.59/+02,
3XT,60=,0.60/+02,0.61/+02,0.62/+02,0.63/+02,
3XT,64=,0.64/+02,0.65/+02,0.66/+02,0.67/+02,
3XT,68=,0.68/+02,0.69/+02,0.70/+02,0.71/+02,
3XT,72=,0.72/+02,0.73/+02,0.74/+02,0.75/+02,
3XT,76=,0.76/+02,0.77/+02,0.78/+02,0.79/+02,
3XT,80=,0.80/+02,0.81/+02,0.82/+02,0.83/+02,
3XT,84=,0.84/+02,0.85/+02,0.86/+02,0.87/+02,

3XT,83=,0.88/+02,0.89/+02,
3YT,-.16/-3,-.515/-3,-.113/-2,-.205/-2,
3YT,4=,-.00333,-.00504,-.00723,-.00911,
3YT,8=-.0133,-.0173,-.0221,-.0277,
3YT,12=,-.0342,-.0416,-.05,-.0596,
3YT,16=,-.0702,-.0821,-.0923,-.11,
3YT,20=,-.126,-.143,-.162,-.182,
3YT,24=,-.203,-.226,-.250,-.276,
3YT,28=,-.303,-.331,-.360,-.390,
3YT,32=,-.421,-.452,-.485,-.517,
3YT,36=,-.550,-.584,-.618,-.653,
3YT,40=,-.688,-.724,-.762,-.800,
3YT,44=,-.840,-.882,-.935,-.983,
3YT,48=,-1.03,-1.07,-1.10,-1.12,
3YT,52=,-1.10,-1.10,-1.09,-1.07,
3YT,56=,-1.04,-.995,-.951,-.904,
3YT,60=,-.856,-.813,-.774,-.732,
3YT,64=,-.692,-.651,-.612,-.586,
3YT,68=,-.571,-.608,-.623,-.617,
3YT,72=,-.559,-.438,-.386,-.364,
3YT,76=,-.450,-.504,-.554,-.594,
3YT,80=,-.588,-.517,-.328,-.313,
3YT,84=,-.511,-.803,-1.04,-1.11,
3YT,88=,-1.13,-1.06,
=BUX,391,14,704,90,2,
SIDEN,10,42,392
3XT,0.,0.10/+01,0.20/+01,0.30/+01,
3XT,4=,0.40/+01,0.50/+01,0.60/+01,0.70/+01,
3XT,8=,0.80/+01,0.90/+01,0.10/+02,0.11/+01,
3XT,12=,0.12/+02,0.13/+02,0.14/+02,0.15/+02,
3XT,16=,0.16/+02,0.17/+02,0.18/+02,0.19/+02,

3XT,20=,0.20/+02,0.21/+02,0.22/+02,0.23/+02,
3XT,24=,0.24/+02,0.25/+02,0.26/+02,0.27/+02,
3XT,28=,0.28/+02,0.29/+02,0.30/+02,0.31/+02,
3XT,32=,0.32/+02,0.33/+02,0.34/+02,0.35/+02,
3XT,36=,0.36/+02,0.37/+02,0.38/+02,0.39/+02,
3XI,40=,0.40/+02,0.41/+02,0.42/+02,0.43/+02,
3XI,44=,0.44/+02,0.45/+02,0.46/+02,0.47/+02,
3XT,48=,0.48/+02,0.49/+02,0.50/+02,0.51/+02,
3XT,52=,0.52/+02,0.53/+02,0.54/+02,0.55/+02,
3XT,56=,0.56/+02,0.57/+02,0.58/+02,0.59/+02,
3XT,60=,0.60/+02,0.61/+02,0.62/+02,0.63/+02,
3XT,64=,0.64/+02,0.65/+02,0.66/+02,0.67/+02,
3XT,68=,0.68/+02,0.69/+02,0.70/+02,0.71/+02,
3XT,72=,0.72/+02,0.73/+02,0.74/+02,0.75/+02,
3XT,76=,0.76/+02,0.77/+02,0.78/+02,0.79/+02,
3XT,80=,0.80/+02,0.81/+02,0.82/+02,0.83/+02,
3XT,84=,0.84/+02,0.85/+02,0.86/+02,0.87/+02,
3XT,88=,0.88/+02,0.89/+02,
3YT,.497/-3,.890/-3,.131/-2,.175/-2,
3YT,4=,.00222,.00271,.00320,.00371,
3YT,8=,.00421,.00471,.00520,.00567,
3YT,12=,.00610,.00650,.00685,.00719,
3YT,16=,.00749,.00772,.00787,.00794,
3YT,20=,.00797,.00798,.00790,.00770,
3YT,24=,.00750,.00728,.00695,.00662,
3YT,28=,.00631,.00591,.00563,.00533,
3YT,32=,.00508,.00495,.00486,.00495,
3YT,36=,.00514,.00552,.00609,.00682,
3YT,40=,.00782,.00899,.0104,.0120,
3YT,44=,.0138,.0158,.0158,.0185,
3YT,48=.0209 .0235 .0266 .0301

3YT,52=,.0402,.0407,.0494,.0511,
3YT,56=,.0498,.0290,.0172,.00708,
3YT,60=-.000444,+.0121,.0102,.0181,
3YI,64=,.0296,.0433,.0608,.0818,
3YT,68=,.107,.159,.192,.204,
3YT,72=,.170,.0733,.0234,-.0311,
3YI,76=,.0853,.112,.114,.0445,
3YT,80=-.0137,-.0831,-.166,-.217,
3YI,84=-.227,-.218,-.207,-.186,
3YT,88=-.182,-.185,
=BOX,392,14,704,90,2,
- SICEN,10,399, WIND, MARCH MEAN
3XT,0,10,20,30,40,50,
3XT,6=,52,54,56,58,60,62,
3XT,12=,64,66,68,70,72,74,
3XT,18=,76,78,80,82,84,90,
3XT,24=,100,
3YT,0,0,1.7,3.1,7.9,13.2,
3YT,6=,14.8,16.2,17.5,19.0,20.6,22.7,
3YT,12=,24.8,27.9,28.9,31.1,33.5,36.9,
3YT,18=,38.2,41.0,43.4,46.0,45.8,34.5,
3YI,24=,7,
=BOX,399,14,704,25,2,
- SICEN,10,-FAX,498
3XT,0.,10.,20.,30.,
3XT,4=,40.,50.,52.,54.,
3XT,8=,56.,58.,60.,62.,
3XT,12=,64.,66.,68.,70.,
3XT,16=,72.,74.,78.,
3XT,20=,80.,85.,90.,95.,
3YT,-5.59586/-1,-2.63582/4,-9.21741/4,-1.16162/5,

3YT,4=-2.24109/5,-4.48626/5,-5.04519/5,-5.81541/5,

3YT,8=-6.73701/5,-7.82210/5,-9.03812/5,-1.03946/6,

3YT,12=-1.17821/6,-1.36803/6,-1.61064/6,-1.82021/6,

3YT,16=-1.83764/6,-1.83753/6,-1.79877/6,-1.73113/6,

3YT,20=-1.65253/6,-1.42943/6,-1.24007/6,-1.06843/6,

=BOX,498,14,704,24,2,

5IDEN,10,QACN,499

3XT,0.,10.,20.,30.,

3XT,4=,40.,50.,52.,54.,

3XT,8=,56.,58.,60.,62.,

3XT,12=,64.,66.,68.,70.,

3XT,16=,72.,74.,76.,78.,

3XT,20=,80.,85.,90.,95.,

3YT,2.23087,1.05604/5,.531939/6,1.47266/6,

3YT,4=.309788/7,.558204/7,.617468/7,.638388/7,

3YT,8=.763549/7,.842268/7,.924951/7,1.01118/7,

3YT,12=,1.08656/7,1.15031/7,1.24548/7,1.31272/7,

3YT,16=,1.22681/7,1.14833/7,1.13763/7,.990133/7,

3YT,20=,.704863/7,1.01051/7,.975338/7,.968884/7,

=BOX,499,14,704,24,2,

=BOX,502,7,-524,0,1,1,,,546,

=BOX,504,7,526,0,1,1,

=BOX,514,7,541,0,1,1,

=BOX,515,7,542,0,1,1,

=BOX,516,7,543,0,1,1,

=BOX,517,7,544,0,1,1,

=BOX,518,7,536,0,1,1,

=BOX,519,7,537,0,1,1,

=BOX,520,7,538,0,1,1,

=BOX,521,7,539,0,1,1,

=BOX,522,7,540,0,1,1,

=B0X,524,9,504,636,,, -1188.87,
=B0X,526,9,504,502,,, -23.92866,
=B0X,536,9,522,504,,, -122676,-592989334,
=B0X,537,9,522,513,504,,, -462383,1,-8833125.8,
=B0X,538,9,522,512,504,,, -90258,1,-7210674.9,
=B0X,539,9,522,520,504,,, -6324.4,1,-57333.3,
=B0X,540,9,522,521,504,,, -142.73,1,-13437.9,
=B0X,541,9,517,504,,, -621.41,-878931.6,
=B0X,542,9,517,514,504,,, -17528.8,1,-8845906.2,
=B0X,543,9,517,515,504,,, -2431.63,1,-570110.72,
=B0X,544,9,517,516,504,,, -93.25,1,-44737.18,
=B0X,546,22,-6,703,524,
=B0X,602,7,-640,0,1,1,,,647,
=B0X,604,7,-605,0,1,1,,,649,
=B0X,605,9,522,643,,, -1,
=B0X,606,13,639,79,,
=B0X,607,11,606,797,
=B0X,617,11,606,799,-1,
=B0X,618,9,215,617,929,
=B0X,619,11,618,795,1,4,
=B0X,623,9,607,215,
=B0X,624,11,623,499,
=B0X,629,13,641,767,-1,
=B0X,636,9,1102,619,
=B0X,639,9,645,1251,
=B0X,640,9,517,641,219,1270,-1,
=B0X,641,9,624,932,1103,
=B0X,643,24,703,602,700,700,
=B0X,645,24,703,604,700,700,
=B0X,647,22,-6,703,640,
=B0X,649,22,-6,703,605,

=B0X,650,11,690,611,
 =B0X,651,11,690,651,
 =B0X,652,7,-651,0,1,1,,600,
 =B0X,653,2,-6,703,651,
 =B0X,654,11,606,697,..000,
 =B0X,655,11,654,614,
 =B0X,656,7,-655,0,1,1,,607,
 =B0X,657,7,-6,703,650,
 5IDEN,10,697 XUP VARIATION
 3XT,0.,10.,20.,30.,40.,50.,52.,54.,56.,58.,60.,62.,64.,66.,68.,70.,72.,
 3XT,17=,74.,76.,78.,80.,85.,90.,95.,
 3YT,-26.75/-3,-113.990,-69182.0,-130605.0,-321625.0,-391422.0,-444136.0,
 3YT,7=-464911.0,-443226.0,-447613.0,-452248.0,-491039.0,-463878.0,
 3YT,13=-537972.0,-422268.0,-422317.0,-2278433.0,-3431687.0,-1865285.0,
 3YT,19=,188983.0,1550156.0,2590528.0,3906482.0,5074637.0,
 =B0X,697,14,704,24,2,
 =B0X,693,11,699,795,0.2,
 5IDEN,10,699,BETA
 3XT,0.,4.9,10.3,17.2,19.5,23.3,26.,27.4,31.1,38.,39.8,42.,44.,48.1,
 3XT,14=,49.4,53.8,56.1,58.,60.,61.9,65.2,70.1,71.5,72.3,73.5,75.,78.,
 3XT,27=,80.,84.,87.,90.,93.,
 3YT,0.,1.93098/-5,1.276/-4,6.53692/-5,6.13814/-4,-3.90147/-4,
 3YT,6=,2.04414/-4,-1.73197/-4,3.23476/-4,-8.44314/-4,-4.49203/-4,
 3YT,11=-1.06355/-3,-3.81821/-4,-8.70805/-4,-7.41673/-3,
 3YT,15=-1.47807/-3,-7.54247/-4,-1.16048/-3,-8.16414/-4,-1.32286/-3,
 3YT,20=-5.14646/-4,-1.04025/-3,-3.80685/-2,-6.19918/-2,
 3YT,24=-7.47121/-2,-6.32109/-2,-2.97494/-2,-2.43823/-2,-2.74983/-2,
 3YT,29=-2.36162/-2,-1.67089/-2,-1.17124/-2,
 =B0X,699,14,704,32,2,
 =B0X,700,1,,,0,
 =B0X,701,1,,,1,

=BX,702,1,,85,

=BX,703,3,,1,,

=BX,704,9,702,703,,,-1,

SIDEN,10,VRS,767

3XT,0.,10.,20.,30.,

3XT,4=,40.,50.,52.,54.,

3X1,8=,56.,58.,60.,62.,

3XT,12=,64.,66.,68.,70.,

3X1,16=,72.,74.,76.,78.,

3XT,20=,80.,85.,90.,95.,

3YT,9.99902/-2,2.17909/1,4.95704/1,8.47414/1,

3YT,4=,1.23839/2,1.84288/2,1.96779/2,2.09955/2,

3YT,8=,2.23754/2,2.38096/2,2.53009/2,2.68343/2,

3YT,12=,2.84290/2,3.00418/2,3.18029/2,3.35714/2,

3YT,16=,3.46375/2,3.56801/2,3.69074/2,3.81720/2,

3YT,20=,3.95566/2,4.37162/2,4.90799/2,5.53469/2,

=BX,767,14,704,24,2,

SIDEN,10,IA,768

3XT,0.,10.,20.,30.,

3XT,4=,40.,50.,52.,54.,

3X1,8=,56.,58.,60.,62.,

3X1,12=,64.,66.,68.,70.,

3XT,16=,72.,74.,76.,78.,

3XT,20=,80.,85.,90.,95.,

3YT,4.86597/-1,229.201/2,114.901/3,315.018/3,

3YT,4=,656.860/3,115.192/4,126.426/4,138.287/4,

3YT,8=,150.386/4,162.541/4,174.785/4,185.808/4,

3YT,12=,194.194/4,201.575/4,217.025/4,229.070/4,

3YT,16=,227.591/4,225.122/4,223.751/4,201.186/4,

3YT,20=,219.242/4,213.018/4,207.427/4,201.185/4,

=BX,768,14,704,24,2,

SIDEN,10,FT/ENC,795

3X1,0.,10.,20.,30.,

3XT,4=,40.,50.,52.,54.,

3XT,8=,56.,58.,60.,62.,

3XT,12=,64.,66.,68.,70.,

3XT,16=,72.,74.,76.,78.,

3XT,20=,80.,85.,90.,95.,

3YT,6.77658/6,6.73827/6,6.83172/6,6.91209/6,

3YT,4=,7.02855/6,7.17499/6,7.20731/6,7.23853/6,

3YT,8=,7.27038/6,7.30264/6,7.33404/6,7.36016/6,

3YT,12=,7.39667/6,7.42769/6,7.45927/6,7.49079/6,

3YT,16=,7.52256/6,7.55250/6,7.58194/6,7.60650/6,

3YT,20=,7.63177/6,7.62947/6,7.73857/6,7.78039/6,

=BX,795,14,704,24,2,

SIDEN,10,MASS,796

3X1,0.,10.,20.,30.,

3XT,4=,40.,50.,52.,54.,

3XT,8=,56.,58.,60.,62.,

3XT,12=,64.,66.,68.,70.,

3XT,16=,72.,74.,76.,78.,

3XT,20=,80.,85.,90.,95.,

3YT,2.90020/6,2.77004/6,2.63951/6,2.53889/6,

3YT,8=,2.16851/6,2.14228/6,2.11605/6,2.08982/6,

3YT,4=,2.37812/6,2.24717/6,2.22096/6,2.19474/6,

3YT,12=,2.06358/6,2.03735/6,2.01242/6,1.98486/6,

3YT,16=,1.96383/6,1.94281/6,1.92179/6,1.90075/6,

3YT,20=,1.87970/6,1.82598/6,1.77431/6,1.72151/6,

=BX,796,14,704,24,2,

SIDEN,10,XCP-XCG,797

3XT,0.,10.,20.,30.,

3XT,4=,40.,50.,52.,54.,

$3X1,8=,56.,58.,60.,62.,$
 $3XT,12=,64.,66.,68.,70.,$
 $3XT,16=,72.,74.,76.,78.,$
 $3XT,20=,80.,85.,90.,95.,$
 $3YT,7.51631,7.50230,7.43110,7.38106,$
 $3YT,4=,7.29813,7.15986,7.11974,7.09841,$
 $3YT,8=,7.03619,7.01728,6.91274,4.9908,$
 $3YT,12=,3.09686,3.36539,4.27049,5.82242,$
 $3YT,16=,8.13696,8.77221,9.39664,11.1236,$
 $3YT,20=,9.23943,12.3186,12.6796,13.2035,$
=BOX,797,14,704,24,2,
51DEN,10,798
 $3XT,0.,10.,20.,30.,40.,50.,52.,54.,56.,58.,60.,62.,64.,66.,68.,70.,72.,$
 $3X1,17=,74.,76.,78.,80.,85.,90.,95.,$
 $3YT,8.71946/8,8.67477/6,8.62533/8,8.56930/8,$
 $3YT,4=,8.50503/6,8.43000/8,8.41191/8,8.39382/8,$
 $3YT,8=,8.37572/8,8.35762/8,8.33952/8,8.31740/8,$
 $3YT,12=,8.29507/8,8.27274/8,8.25041/8,8.22807/8,$
 $3YT,16=,8.21017/8,8.18863/8,8.16554/8,8.14244/8,$
 $3YT,20=,8.11933/8,8.06150/8,7.99604/8,7.92282/8,$
=BOX,798,14,704,24,2,
51DEN,10,799-XCG
 $3X1,0.,10.,20.,30.,40.,50.,52.,54.,56.,58.,60.,62.,64.,66.,68.,70.,72.,$
 $3X1,17=,74.,76.,78.,80.,85.,90.,95.,$
 $3YT,27.6204,27.6121,27.6432,27.7250,$
 $3YT,4=,27.8631,28.0665,28.1236,28.1806,$
 $3YT,8=,28.2377,28.2948,28.3519,28.4313,$
 $3YT,12=,28.5119,28.5925,28.6731,28.7537,$
 $3YT,16=,28.8184,28.8981,28.9842,29.0703,$
 $3YT,20=,29.1566,29.3723,29.6217,29.9056,$
=BOX,799,14,704,24,2,

=10X,901,7,-903,0,1,1,,,943,
=00X,902,7,-907,0,1,1,,,950,
=00X,903,9,908,904,
=80X,904,11,906,980,-1,,,980,
=60X,905,11,906,980,-1,
=80X,906,11,941,945,
=80X,907,9,913,946,905,
=80X,908,9,909,911,1249,
=80X,909,11,636,984,
=80X,911,11,517,985,-1,
=80X,913,11,522,965,
=80X,914,13,906,981,
=80X,915,11,914,1278,,,,,1274,1297,
=80X,916,11,914,1278,,,,,1275,1293,
=80X,917,11,914,1278,130000,,,1289,
=80X,918,11,914,1278,16000,,,1285,
=80X,919,11,914,1274,,,,,1296,
=80X,920,11,914,1275,,,,,1292,
=80X,921,11,914,1288,130000,
=80X,922,11,914,1284,16000,
=80X,923,11,914,982,
=80X,925,11,914,708,,,,,983,
=80X,929,9,923,1023,
=80X,932,9,925,1025,
=80X,933,9,915,1015,
=80X,934,9,916,1016,
=80X,935,9,917,1017,
=80X,936,9,918,1018,
=80X,937,9,919,1019,
=80X,938,9,920,1020,
=80X,939,9,921,1021,

=30X,940,2,922,1022,
=30X,941,13,10,-11/3,0,0,337,701,
=30X,742,13,10,-1194,0,0,133,701,
=30X,743,13,10,-1193,0,0,132,701,
=30X,944,13,10,-1176,0,0,940,701,
=30X,745,13,10,-1171,0,0,248,701,
=30X,946,24,703,901,706,706,
=30X,747,24,703,902,700,700,
=30X,748,0,1258,

=30X,949,22,-6,703,903,
=30X,80,22,-6,703,907,

SIDEN,10, 980 - BENDING FREQUENCY MODE 1

3XT,0,40,82,100,

3YT,5.75414,5.93761,6.10725,6.17197,

=30X,980,14,704,4,2,

SIDEN,10, 981 - GEN MASS MODE 1

3XT,0,40,82,100,

3YT,13630,12230,11050,10690,

=30X,981,14,704,4,2,

SIDEN,10, 982 - Y1(G1M. PT.)

3XT,0,40,82,100,

3YT,.09342,.08795,.0832,.08403,

=30X,982,14,704,4,2,

SIDEN,10, 983 - NORMAL FORCE COEFF. MODE 1

3XT,0,42,29.31,62.81,66.06,71.73,

3XT,6=.74.1,63.63,89.97,100,

3YT,.5086,.4766,.4584,.49065,.4474,.5125,

3YT,6=.442,.3254,.3526,.3484,

=30X,983,14,704,10,2,

SIDEN,10, 984 - Y1(G1M. PI.)

3XT,0,40,82,100,

3Y1,-.004383,-.004264,-.004061,-.004022,
=B0X,984,14,704,4,7,
510E4,10,-985 = Y1^((X-MEASURE))
3X1,0,40,32,100,
3Y1,.01635,.01626,.01612,.01604,
=B0X,985,14,704,4,7,
=B0X,1001,7,-1003,0,1,1,,,1042,
=B0X,1002,7,-1007,0,1,1,,,1050,
=B0X,1003,9,1008,1004,
=B0X,1004,11,1006,1080,-1,,,1080,
=B0X,1005,11,1006,1080,-1,12,
=B0X,1006,9,1047,1045,
=B0X,1007,9,1013,1046,1005,
=B0X,1008,9,1009,1011,1252,
=B0X,1009,11,636,1084,
=B0X,1011,11,517,1085,-1,
=B0X,1013,11,522,1085,
=B0X,1014,13,1006,1081,
=B0X,1015,11,1014,1273,,,,,1299,1274,
=B0X,1016,11,1014,1273,,,,,1299,1275,
=B0X,1017,11,1014,1278,13000,,,1291,
=B0X,1018,11,1014,1276,16000,,,1287,
=B0X,1019,11,1014,1274,,,,,1293,
=B0X,1020,11,1014,1275,,,,,1294,
=B0X,1021,11,1014,1290,130000,
=B0X,1022,11,1014,1286,16000,
=B0X,1023,11,1014,1082,
=B0X,1025,11,1014,768,,,,,1083,
=B0X,1045,13,10,-1192,,,1040,701,
=B0X,1046,24,703,1001,700,700,
=B0X,1047,24,703,1002,700,700,

=0IX,1048,6,1259,
=6UX,1049,22,-6,703,1003,
=0IX,1050,22,-6,703,1007,
S1EN,10, 1080 - SPINDING FFL0 MODE 2
3XT,0,40,32,100,
3YT,9.92114,10.3107,10.8630,11.071,
=0IX,0080,14,704,4,2,
S1EN,10, 1081 - GEAR MASS MODE 2
3XT,0,40,32,100,
3YT,5949,5547,4627,4300,
=6UX,1081,14,704,4,2,
S1EN,10, 1082 - Y2(GFM. PT.)
3XT,0,40,32,100,
3YT,-.06230,-.06579,-.05894,-.05469,
=6UX,1082,14,704,4,2,
S1EN,10, 1083 - NORMAL FORCE COEFF. MODE 2
3XT,0,42,54.31,62.61,66.06,71.73,
3X1,6=,79.1,83.63,89.97,100,
3YT,-.3055,-.2801,-.2785,-.2802,-.2984,-.2836,
3YT,6=,-.2473,-.2247,-.2033,-.1658,
=0IX,1083,14,704,10,2,
S1EN,10, 1084 - Y2(GFM. PT.)
3XT,0,40,82,100,
3YT,.003427,.003734,.00348,.003238,
=6UX,1084,14,704,4,2,
S1EN,10, 1085 - Y2(X-MEASURED)
3XT,0,40,32,100,
3YT,6.76/-3,5.34/-3,3.253/-3,2.47/-3,
=6UX,1085,14,704,4,2,
=6UX,1102,11,10,1198,
=8UX,1103,11,10,1197,

SIDEN,10, 1191 BM COEFF BENDING MODE 1

3XT,0,70,30,100,

3YT,-4.93/6,-4.93/6,-4.93/6,-4.93/6,

=30X,1191,14,704,4,2,

SIDEN,10, 1192 BM COEFF BENDING MODE 2

3XT,0,70,30,100,

3YT,-2.44/6,-2.44/6,-3.5/6,-3.5/6,

=30X,1192,14,704,4,2,

SIDEN,10, 1193 BM COEFF SLUSH TANK 0 S'IC LOX

3XT,0,10,20,30,40,50,

3X1,6=,60,70,80,90,100,

3YT,-781/3,-1610/3,-1959.8/3,-1116.34/3,-1172.6/3,-1062.4/3,

3Y1,6=,-924.77/3,-796.47/3,-677.44/3,-572.65/3,-474.3/3,

=30X,1193,14,704,11,2,

SIDEN,10, 1194 BM COEFF SLUSH TANK 2 S'IC FUEL

3XT,0,10,20,30,40,50,

3X1,6=,60,70,80,90,100,

3YT,531.4/3,834/3,1024/3,1108/3,1170/3,1220/3,

3Y1,6=,1260/3,1293/3,1310/3,1324/3,1265/3,

=30X,1194,14,704,11,2,

SIDEN,10, 1195 BM COEFF SLUSH TANK 3 S'II LOX

3XT,0,10,20,30,40,50,

3X1,6=,60,70,80,90,100,

3YT,-214.4/3,-235.9/3,-253.3/3,-281.3/3,-305.3/3,-329.6/3,

3Y1,6=,-324.6/3,-379.3/3,-405.5/3,-431.8/3,-443.9/3,

=30X,1195,14,704,11,2,

SIDEN,10, 1196 BM COEFF SLUSH TANK J4 S'IVB LOX

3XT,0,10,20,30,40,50,

3X1,6=,60,70,80,90,100,

3YT,62530,57400,52200,47100,41900,36600,

3Y1,6=,31600,26700,21700,17500,18500,

=30X,1196,14,704,11,2,

SIDEN,10, 1197 n) ALPHA

3CT,0,10,20,30,40,50,

3CT,6=,52,54,56,58,60,62,

3CT,12=,64,66,68,70,72,74,

3CT,18=,76,78,80,82,84,86,

3CT,24=,100,

3YT,0,1/6,4/6,11/6,23/6,44/6,

3YT,6=,48.5/6,53/6,58.1/6,65/6,73/6,73/6,

3YT,12=,95/6,89/6,93/6,93/6,101/6,117.5/6,

3YT,18=,119/6,115/6,105/6,90/6,79/6,55/6,

3YT,24=,30/6,

=30X,1197,14,704,25,2,

SIDEV,10, 1196 n PRIME BETA

3CT,0,10,20,30,40,50,

3CT,6=,52,54,56,58,60,62,

3CT,12=,64,66,68,70,72,74,

3CT,18=,76,78,80,82,84,86,

3CT,24=,100,

3YT,334/6,334/6,334/6,334.1/6,334.2/6,334.2/6,

3YT,6=,334.2/6,332.5/6,328/6,322/6,318/6,315/6,

3YT,12=,313/6,314/6,318/6,319.5/6,320.3/6,320.8/6,

3YT,18=,321/6,321/6,321/6,325/6,349/6,349/6,

3YT,24=,347/6,

=30X,1198,14,704,25,2,

=30X,1201,7,-1209,0,1,1,,,1309,

=30X,1202,7,-1210,0,1,1,,,1310,

=30X,1203,7,-1214,0,1,1,,,1311,

=30X,1204,7,-1215,0,1,1,,,1312,

=30X,1205,7,-1219,0,1,1,,,1313,

=30X,1206,7,-1220,0,1,1,,,1314,

=60X,1207,7,-1224,0,1,1,,1315,
=60X,1208,7,-1225,0,1,1,,1316,
=60X,1209,9,133,1212,
=60X,1210,9,1301,1213,
=60X,1211,9,1302,1214,
=60X,1212,11,1280,1280,-1,,,1211,
=60X,1213,11,1271,1280,-2,,,1211,
=60X,1214,9,934,1217,
=60X,1215,9,1303,1218,
=60X,1216,9,1304,942,
=60X,1217,11,1281,1281,-1,,,1216,
=60X,1218,11,1279,1281,-2,,,1216,
=60X,1219,9,935,1224,
=60X,1220,9,1305,1223,
=60X,1221,9,1306,943,
=60X,1222,11,1282,1282,-1,,,1221,
=60X,1223,11,1262,1221,-0.094,
=60X,1224,9,936,1227,
=60X,1225,9,1307,1228,
=60X,1226,9,1308,944,
=60X,1227,11,1283,1283,-1,,,1226,
=60X,1228,11,1283,1226,-0.068,
=60X,1229,9,1276,799,,,,-1,
=60X,1230,11,1278,1297,,,1211,
=60X,1232,11,1211,1229,
=60X,1233,11,1278,1299,,,1211,
=60X,1234,9,1277,799,,,,-1,
=60X,1235,11,1278,1293,,,1216,
=60X,1237,11,1234,1216,
=60X,1238,11,1278,1295,,,1216,
=60X,1239,9,701,799,,,42,1657,-1,

1238, 1240, 11, 1274, 1283, 1284, 1285,

=130X, 124Z, 11, 14-1, 1432,

-86(X,1243,11,1<73,1<31,0,0,1221,

= 0.0X, 1244, 3, 701, 110, , , 0.1, 2848, -1,

=BX,1245,11,1270,1280,,,,1226,

=156x,1247,11,1e26,1e44,

= 'IX, 1248, 11, 1278, 1287, . . . , 1226,

= 30,1249,9,1<30,1235,1240,124>,

= 31 X, 1251, 3, 1432, 1237, 1242, 1247,

= 501X, 1252, 5, 1253, 1258, 1245, 1248,

=1203,4,1211,1216,1221,1226,

= 30X, 1254, 13, 1<11, -1296, -1, , , -1, 1<16, -1292,

=t..x,1255,13,1211,-1293,-1,,,-1,1216,-1294,

=b2x,1256,15,1221,-1288,-1,,,,-1,1226,-1284,

=8.3X,1257,13,1221,-1290,-1,,,,-1,1226,-1286,

=B1IX,1258,3,1254,1256,

=RGX,1259,9,1255,1<57,

=BX,1270,11,1253,1278,

=80X,1271,4,,,.010,.62632,,.041,

SIDEN, 10,-1274- SIC LOX MASS

3xT,0,5,10,90,95,100,

3YT, 162/3, 188/3, 200/3, 200/3, 193/3, 191/3,

= 20 x, 1274, 14, 704, 6, 2,

SIDEV,10,-1275- SIC FUEL MASS

3xT,0,5,10,15,20,25,

$3 \times T, 6 = , 30, 35, 40, 45, 50, 55,$

3XT, 12=, 60, 65, 70, 75, 80, 85,

$3 \times 1,18 = ,90,95,100,$

3YT, 83/3, 104/3, 120

3YT, 6=, 140.5/3, 141/3, 141/3, 140.8/3, 140.4/

3YT, 12=, 139.5/3, 138.75/3, 138/3, 137/3, 136/3, 135/3,

3Y1,13=,134/3,131.4/3,128.5/3,
=00X,1275,14,704,21,2,
S10EN,10,-1276- SIC LDX X51
3XT,0,5,10,15,20,25,
3XT,6=,30,35,40,45,50,55,
3XT,12=,60,65,70,75,80,85,
3YT,18=,90,95,100,
3Y1,28.6,28.27,27.9,27.5,27.1,26.63,
3Y1,6=,26.15,25.68,25.2,24.67,24.16,23.67,
3Y1,12=,23.19,22.73,22.27,21.23,21.4,21,
3YT,16=,20.6,20.2,19.85,
=00X,1276,14,704,21,2,
S10EN,10,-1277- SIC FULL X52
3XT,0,5,10,15,20,25,
3XT,6=,30,35,40,45,50,55,
3XT,12=,60,65,70,75,80,85,
3YT,18=,90,95,100,
3Y1,9.5,9.17,8.85,8.55,8.27,8,
3YT,6=,7.75,7.5,7.25,7.01,6.73,6.56,
3Y1,12=,6.34,6.12,5.87,5.7,5.5,5.3,
3YT,18=,5.1,4.9,4.74,
=00X,1277,14,704,21,2,
S10EN,10,-1278- AXIAL ACCEL.
3XT,0,5,10,15,20,25,
3XT,6=,30,35,40,45,50,55,
3XT,12=,60,65,70,75,80,85,
3XT,18=,90,95,100,
3YT,11.6,11.9,12.2,12.6,13,13.4,
3YT,6=,13.9,14.2,14.7,15.2,15.7,16.3,
3YT,12=,17,17.65,18.3,19,19.8,20.75,
3YT,18=,21.7,22.75,23.8,

=EUX,1278,14,704,21,2,

SILEN,10,-1279- SIC FUEL DAMPING

3XT,0,3,5,9,12,13,

3XT,6=,14,14,1,10,10,21,27,

3XT,12=,27,5,28,29,1,29,5,31,37,

3XT,18=,43,44,45,46,1,46,47,

3XT,24=,53,57,60,61,61,1,62,

3XT,30=,63,62,74,75,76,76,1,

3XT,36=,77,78,84,90,91,92,

3XT,42=,92,1,93,94,100,

3YT,.025,.027,.03,.0425,.0565,.057,

3YT,6=,.0565,.0255,.0255,.0255,.0375,.0565,

3YT,12=,.0565,.0255,.0255,.0255,.0375,

3YT,18=,.0565,.057,.0565,.0255,.0255,.0255,

3YT,24=,.038,.0565,.057,.0565,.0255,.025,

3YT,30=,.0255,.0365,.0565,.057,.0565,.0255,

3YT,36=,.0255,.0255,.0375,.0555,.056,.0555,

3YT,42=,.0245,.024,.0245,.0375,

=EUX,1279,14,704,46,2,

SILEN,10,-1280- SIC LOX FREQ.

3XT,0,5,10,15,20,25,

3XT,6=,30,35,40,45,50,55,

3XT,12=,60,65,70,75,80,85,

3XT,18=,90,95,100,

3YT,2.262,2.1677,2.1363,2.1363,2.1677,2.2117,

3YT,6=,2.2494,2.2871,2.3311,2.3688,2.4065,2.4442,

3YT,12=,2.4291,2.5321,2.5761,2.6389,2.7018,2.752,

3YT,18=,2.8149,2.8903,2.9037,

=EUX,1280,14,704,21,2,

SILEN,10,-1281- SIC FUEL FREQ.

3XT,0,5,10,15,20,25,

3XT,6=,30,35,40,45,50,55,
3XT,12=,60,65,70,75,80,85,
3XT,18=,90,95,100,
3YT,2.6383,2.5502,2.2305,2.1928,2.1865,2.2054,
3YT,6=,2.2494,2.2934,2.3436,2.3876,2.4316,2.4631,
3YT,12=,2.5007,2.5384,2.5761,2.6264,2.6760,2.7081,
3YT,18=,2.752,2.796,2.84,
=BUX,1281,14,704,21,2,
SIDEN,10,-1282- S11 LOX FREQ.
3XT,0,5,10,15,20,25,
3XT,6=,30,35,40,45,50,55,
3XT,12=,60,65,70,75,80,85,
3XT,18=,90,95,100,
3YT,2.4819,2.5007,2.5196,2.5447,2.5761,2.6138,
3YT,6=,2.6515,2.7018,2.752,2.8023,2.8526,2.9091,
3YT,12=,2.9657,3.0222,3.0783,3.1416,3.217,3.2924,
3YT,18=,3.3678,3.4495,3.5374,
=BUX,1282,14,704,21,2,
SIDEN,10,-1283- S1VB LOX FREQ.
3XT,0,5,10,15,20,25,
3XT,6=,30,35,40,45,50,55,
3XT,12=,60,65,70,75,80,85,
3XT,18=,90,95,100,
3YT,3.9773,4.015,4.0589,4.1092,4.1595,4.216,
3YT,6=,4.2251,4.3731,4.4673,4.5302,4.593,4.6621,
3YT,12=,4.7438,4.8318,4.926,5.0328,5.1522,5.2779,
3YT,18=,5.4098,5.548,5.6926,
=BUX,1283,14,704,21,2,
SIDEN,10,-1284- S1VB LOX Y1(X54)
3XT,0,40,82,100,
3YT,.015656,.000604,-.0140545,-.018457,

=BX,1284,14,704,4,2,
SIDEN,10,-1285- SIVB LOX Y1'(XS4)
3XT,0,40,32,100,
3YT,.0079176,.0074104,.0063062,.006692,
=BX,1285,14,704,4,2,
SIDEN,10,-1286- SIVB LOX Y2(XS4)
3XT,0,40,32,100,
3YT,-.11618,-.10932,-.09676,-.09142,
=BX,1286,14,704,4,2,
SIDEN,10,-1287- SIVB LOX Y2'(XS4)
3XT,0,40,32,100,
3YT,-.6085/-3,-6.5007/-3,-7.4906/-3,-7.7618/-3,
=BX,1287,14,704,4,2,
SIDEN,10,-1288- SII LOX Y1(XS3)
3XT,0,40,32,100,
3YT,-.0579185,-.063294,-.066132,-.066026,
=BX,1288,14,704,4,2,
SIDEN,10,-1289- SII LOX Y1'(XS3)
3XT,0,40,32,100,
3YT,-4.133/-4,-9.637/-4,-1.4729/-4,-1.6643/-3,
=BX,1289,14,704,4,2,
SIDEN,10,-1290- SII LOX Y2(XS3)
3XT,0,40,32,100,
3YT,3.465/-3,.015237,.029682,.033813,
=BX,1290,14,704,4,2,
SIDEN,10,-1291- SII LOX Y2'(XS3)
3XT,0,40,32,100,
3YT,-4.0038/-3,-3.175/-3,-1.7504/-3,-1.1794/-3,
=BX,1291,14,704,4,2,
SIDEN,10,-1292- SIC FUEL Y1(XS2)
3XT,0,40,32,100,

3YT,.052923,.016342,.060761,.064526,
=BOX,1292,14,704,4,2,
SIDEN,10,-1293- SIC FUEL Y1*(XS2)
3XT,0,40,32,100,
3YT,-.00477574,-.0045182,-.0041473,-.004049,
=BOX,1293,14,704,4,2,
SIDEN,10,-1294- SIC FULL Y2*(XS2)
3XT,0,40,32,100,
3YT,-.0277365,-.0374267,-.039445,-.038837,
=BOX,1294,14,704,4,2,
SIDEN,10,-1295- SIC FUEL Y2*(XS2)
3XT,0,40,32,100,
3YT,.0041468,.00427,.003674,.033152,
=BOX,1295,14,704,4,2,
SIDEN,10,-1296- SIC LOX Y1(XS1)
3XT,0,40,32,100,
3YT,-.0318016,-.021613,-.002375,.0012794,
=BOX,1296,14,704,4,2,
SIDEN,10,-1297- SIC LOX Y1*(XS1)
3XT,0,40,32,100,
3YT,-.0031957,-.0035692,-.0037982,-.0038718,
=BOX,1297,14,704,4,2,
SIDEN,10,-1298- SIC LOX Y2*(XS1)
3XT,0,40,32,100,
3YT,.03104,.030386,.020341,.014663,
=BOX,1298,14,704,4,2,
SIDEN,10,-1299- SIC LOX Y2*(XS1)
3XT,0,40,32,100,
3YT,.00084206,.0018648,.0027112,.0028091,
=BOX,1299,14,704,4,2,
=BOX,1301,24,703,1201,700,100,

=BX,1302,24,703,1202,700,700,
=BX,1303,24,703,1203,700,700,
=BX,1304,24,703,1204,700,700,
=BX,1305,24,703,1205,700,700,
=BX,1306,24,703,1206,700,700,
=BX,1307,24,703,1207,700,700,
=BX,1308,24,703,1208,700,700,
=BX,1309,22,-6,703,1209,
=BX,1310,22,-6,703,1210,
=BX,1311,22,-6,703,1211,
=BX,1312,22,-6,703,1212,
=BX,1313,22,-6,703,1213,
=BX,1314,22,-6,703,1220,
=BX,1315,22,-6,703,1224,
=BX,1316,22,-6,703,1225,
3EAX,3=,1/-6,,1/-6,.9,
3EMAX,1/-2,1/-3,20,
3PRINIC,10,PRINTD,10,
=BX,-99,
8
\$\$
\$\$

4.0 PARAMETER OPTIMIZATION FILTER SYNTHESIS METHOD

This program was used to obtain second order filter coefficients. It proved impractical because of excessive program cost. The method was programmed in Fortran and run on the CDC 160G computer.

4.0 PARAMETER OPTIMIZATION PROGRAM

```

DIMENSION COV(18,18)
DIMENSION V0(18),V1(18),Q0(18),Q1(18)
DIMENSION RV0(18),RV1(18),RQ0(18),RQ1(18)
DIMENSION FF(18),F(18),XX(18),X(18),XXX(18,18)

1684 FORMAT(1H1)
4718 FORMAT(5X,15HSFEEKING MINIMUM)
4217 FORMAT(5X,13MMINIMUM FOUND)
4216 FORMAT(5X,7H0=0.1E0)
4215 FORMAT(5X,7H0=0.5E0)
4214 FORMAT(5X,7H0=-0.5E0)
606 FORMAT(F14.8,10X,E14.8,10X,I5)
1476 FORMAT(3X,7HMPARTIAL DERIVATIVES S=-1.E-49)
1475 FORMAT(5X,3HNA=I6.5X,5HNSTP=,I6)
1474 FORMAT(6X,7H0=0.1AX,2H0=1AX,2H0=0.1BX,2H0=1)
1473 FORMAT(4X,7H0BS-COV+10X+1HE,21X,7HCAL-COV+16X,9HPERCENT-E)
2358 FORMAT(1E+15)
7A1 FORMAT(2X,15)
5n5 FORMAT(E14.8,10X,E14.8,10X,E14.8)
98 FORMAT(E14.8)
96 FORMAT(E14.8,6X,E14.8,6X,E14.8,6X,E14.8)
70 FORMAT(E10.4)
I1=1
QQQ=0.
NSTP=1
READ 761,NSS
SSS=1.E29
PRINT 1684
DO 69 I=1,18
DO 69 J=I,18
READ 70,COV(I,J)
PRINT 98,COV(I,J)
49 CONTINUE
PRINT 1684
REWIND 3
DO 88 I=1,17
RV0(I)=0.
RV1(I)=0.
RQ0(I)=0.
RQ1(I)=0.
READ INPUT TAPE 3,96,V0(I),V1(I),Q0(I),Q1(I)
PRINT 96,V0(I),V1(I),Q0(I),Q1(I)
88 CONTINUE
PRINT 1684
REWIND 3
NSTP=100
NQQ=0
NAGC=0
IDELTA=10
150 IF(NSTP=1)530,301,530
530 IF(NSTP=6)540,1250,54n
540 JST=2
IF(NSTP=4)307,560,560
560 JST=1
3n2 DO 4444 NA=JST,NSS
PRINT 1475,NA,NSTP
GO TO (202,202,204,204,205),NSTP
2n2 V0(NA)=V0(NA)*5.00:1
GO TO 44
2n4 Q0(NA)=Q0(NA)*1.0001
GO TO 44
2n5 Q1(NA)=Q1(NA)*1.0001

```

```

44 CONTINUF
301 NNSS=1
  DO 95 I=1,N
    XX(I)=V0(I+1)
95  X(I)=0.
J9=NSS
  DO 1091 J=1,N
  DO 1091 IT=1,1000
1091 XXX(I,J)=0.
IT=N*1000
208 ABCT=IT
ABCT1=(ABCT/1000.)
JT=ABCTT
IF(JT*1000-IT)800,801,800
801 J9=J9-1
PRINT 2358,J9,IT
PRINT 98,XX(1,1)
800 CONTINUE
  ITT=JT+1
  IP=ITT+1
IRX=IT-JT*1000
AQ0=Q0(IP)-Q0(ITT)*IRX/1000.
AQ1=Q1(IP)-Q1(ITT)*IRX/1000.
DO 473 I=J9,N
FF(I)=-AQ0*X(I)
F(I)=XX(I)-AQ1*X(I)
XX(I)=XX(I)+FF(I)*IDFI 1A
473 X(I)=X(I)+F(I)*IDELTA
IT=IT-IDELTA
DO 7171 I=J9,N
DO 7171 J=1,N
7171 XXX(I,J)=XXX(I,J)+X(I)*X(J)*IDELTA
IF(ITT)208,999,200
999 SS=0.
PRINT 1473
DO 377 I=1,N
DO 377 J=1,N
E=COV(I,J)-XXX(I,J)
PER=100*E/COV(I,J)
IEE=PER
IF(INSTP=1)233,234,233
234 PRINT 606,COV(I,J),E,XXX(I,J),IFE
233 CONTINUF
377 SS=SS+E*E
PRINT 98,SS
IF(NQQ=100) 1255,3111,1255
1255 GO TO(3001,3002,3002, 004,3005),NSTP
3001 IF(SSS=SS)1270,1270,3111
1270 IF(NQS14312,1280,4312
1280 NQS=1
  Q=-.5*Q
  PRINT 4214
  GO TO 7766
4312 Q=.5*Q
  PRINT 4215
  GO TO 7766
3111 CONTINUE
IF(INSTOP=100,1350,1260,1350
1350 IF(INABC=1)1360,1360,1757
1360 Q=.1*Q
  PRINT 4216
  NOPTS=101
  NAGC=10
  NQQ=100
  NSTOP=0
  SS=SS

```

```

GO TO 7766
1357 IF (SS=SS0) 7531,1380,1380
1380 W=0
PRINT 4217
NOPTS=101
NSTOK=100
GO TO 7766
7571 SS0=SS
PRINT 4218
NOPTS=101
GO TO 7766
1240 SSS=SS
PRINT 505,SSS,RR,0
NSTOK=0
NAGC=0
NQD=0
NSTP=?
GO TO 150
3002 KV0(NA)=SS
VN(NA)=VN(NA)/1.0001
GO TO 4444
3004 RQ0(NA)=SS
QN(NA)=QN(NA)/1.0001
GO TO 4444
3005 KQ1(NA)=SS
Q1(NA)=Q1(NA)/1.0001
4444 CONTINUE
IF (NSTP=2) 4141,4141,4142
4141 NSTP=NSTP+1
NSTP=NSTP+1
4142 NSTP=NSTP+1
GO TO 150
1250 CONTINUE
PRINT 1484
PRINT 1476
DO 1360 J=1,NSS
KQ(J)=SSS
IF (J=1) 1253,1253,1252
1252 KV0(J)=(SSS-PV0(J))/VN(J)
1253 KQ(J)=(SSS-RQ0(J))/Q0(J)
KQ1(J)=(SSS-RQ1(J))/Q1(J)
KRR=RRA,RV0(J))**4
KRR=RRA,(RQ0(J))**4
KRR=RRA+(RQ1(J))**4
PRINT 54,PV0(J),RQ0(J),RQ1(J)
1360 CONTINUE
PRINT 1484
KRS1,E8*(RRA**.5)
PRRS=0,
NWRS=0
W=-1.E4*SSS/RH
7766 CONTINUE
PRINT 1484
PRINT 1474
DO 2345 J=1,17
V0(J)=VN(J)-PV0(J)*Q
Q0(J)=Q0(J)-RQ0(J)*Q
Q1(J)=Q1(J)-RQ1(J)*Q
PRINT 96,V0(J),V1(J),Q0(J),Q1(J)
IF (NOPTS=101) 2345,2349,2345
2349 WHITE OUTPUT TAPE 3,V0(J),V1(J),Q0(J),Q1(J)
2345 CONTINUE
NOPTS=0
REWIND 3
PRINT 1484
VN(1)=100.

```

V1(1)=100.
NSTP=1
GO TO 150
END

5.0 CONSTRAINED RESPONSE FILTER SYNTHESIS METHOD

This synthesis method was used to obtain the third order filter used in the statistical response study. The method consists of several programs. Each program generates a data file for an interfacing program. All programs were programmed for the GE 635 Time Share System in Time Share Fortran.

The following programs are included here:

OPTFIL - The basic optimization scheme used to obtain coefficients of the constrained response equation. This program starts with the covariance data and ends up with equation coefficients.

5FIT Q0 - Calculates derivatives of constrained
5FIT Q1 response coefficients. Generates
5FIT Q2 coefficient derivative files.

FILTER - Calculates filter feedback coefficients from constrained response coefficients and their derivatives.

ICC - Calculates filter forward feed coefficients from constrained response coefficients.

ROFTFIL - Calculates feedback coefficients in time domain from those in the altitude domain.

TIC-CAL - Calculates filter forward feed coefficients in time domain from these in altitude domain.

Figure 1 shows the relationship between these programs and the data files generated by them.

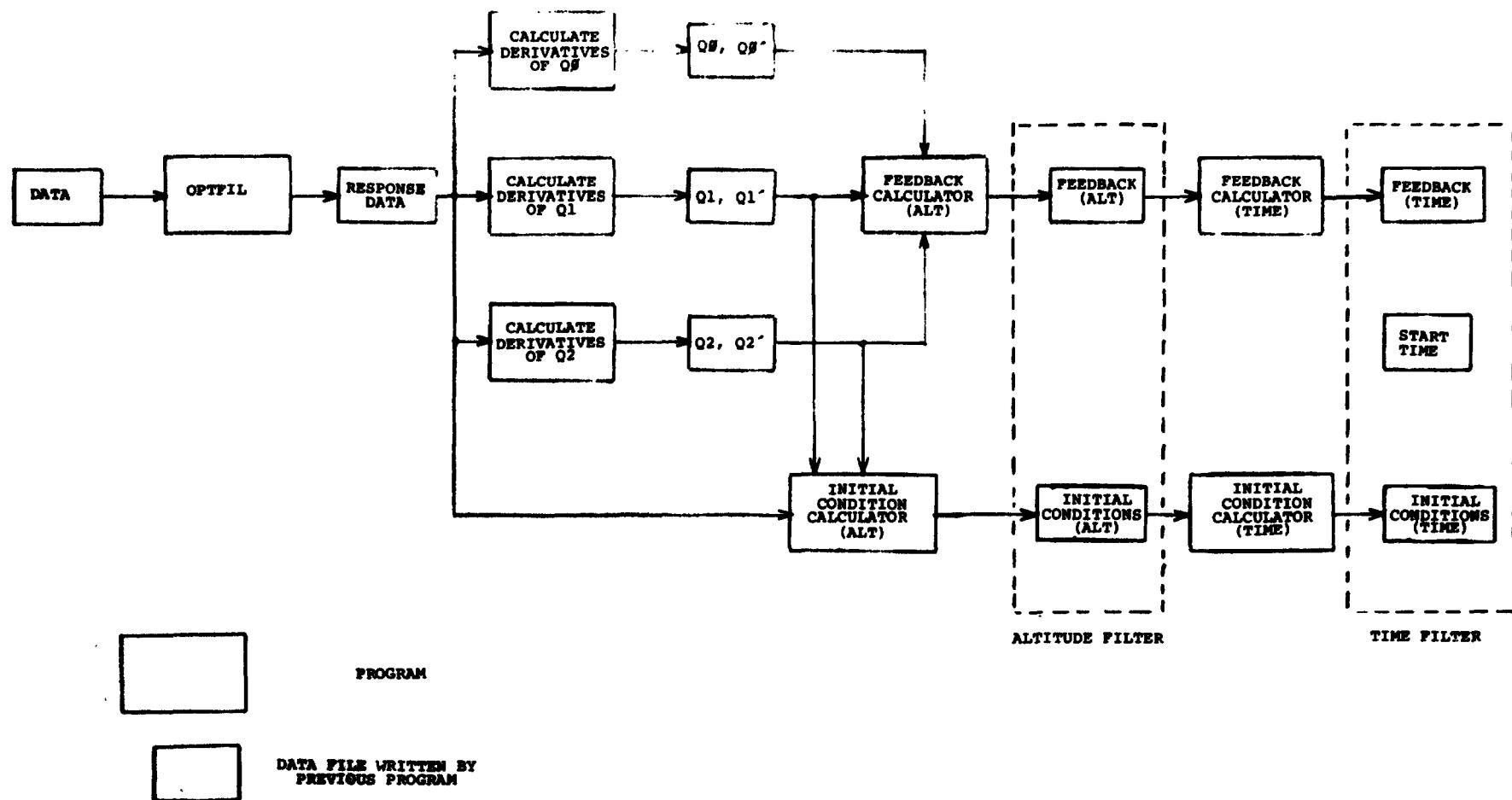


FIGURE 1: (Program - Data File) Relationships for Filter Synthesis

5.1 OPTFIL

```
10 DIMENSION A(23,23),COV(23,23),S(23)
20 DIMENSION V2(18),Q2(18),V1(18),V0(18),Q1(18),Q0(18)
30 DIMENSION RV0(18),RV1(18),RV2(18),RQ1(18),RQ0(18),RQ2(18)
40 DIMENSION XXX(18,18),X(18)
50 DIMENSION LT(18)
60 MFF=0
70 76 FORMAT(E8.2,I3)
80 1400 FORMAT(V)
90 NSS=9
100 SSS=1.E29
110 READ ("DATA",1400)(S(I),I=1,22)
120 N=1
130 NSTOP=100;NQQ=0;NAGC=0
140 J=2
150 60 READ ("DATA",1400,END=56)(A(I,J),I=1,N)
160 GO TO 70
170 56 PRINT:"XXXXXXXXXXXXXX"
180 STOP
190 70 N=N+1
200 J=J+1
210 IF(J.LT.23)GO TO 60
220 DO 53 I=1 ,22
230 53 A(I,I)=1.
240 DO 69 I=2,22
250 DO 69 J=2,22
260 L=I-1
270 M=J-1
280 A(J,I)=A(I,J)
290 COV(L,M)=S(I)*S(J)*A(I,J)
300 69 CONTINUE
310 PRINT:"COV-OK"
320 NSTP=1
330 V0(1)=100
340 331 CONTINUE
350 BEGIN FILE "FCD"
360 V1(1)=100
370 DO 1255 I=1,17
380 READ("FCD",1400)V0(I),V1(I),V2(I)
390 1255 READ("FCD",1400)Q0(I),Q1(I),Q2(I)
400 IDELT=200
410 READ:DFFF,DFF,DF
420 DO 973 I=1,17
430 READ("PART",1400) Q,RR,E
440 972 CONTINUE
450 V1(I)=V1(I)-SIGN(1.,RR)*DFF*ABS(V1(I))
460 V0(I)=V0(I)-SIGN(1.,Q)*DFFF*ABS(V0(I))
470 V2(I)=V2(I)-SIGN(1.,E)*DF*ABS(V2(I))
480 J=I
```

```

490 READ("PART",1400) Q,RR,E
500 973 CONTINUE
510 BEGIN FILE "PART"
520 NSS=17
530 MFF=0
540 150 IF(NSTP.EQ.1) GO TO 301
550 IF(NSTP.EQ.8) GO TO 1250
560 JST=2
570 IF(NSTP.LT.5) GO TO 302
580 JST=1
590 302 DO 4144 NA=JST,NSS
600 GO TO (202,202,203,204,205,206,207),NSTP
610 P02 V0(NA)=V0(NA)*1.0001
620 GO TO 44
630 203 V1(NA)=V1(NA)*1.0001
640 GO TO 44
650 204 V2(NA)=V2(NA)*1.0001
660 GO TO 44
670 205 Q0(NA)=Q0(NA)*1.0001
680 GO TO 44 .
690 206 Q1(NA)=Q1(NA)*1.0001
700 GO TO 44
710 207 Q2(NA)=Q2(NA)*1.0001
720 44 CONTINUE
730 301 N=NSS-1
740 DO 1091 I=1,N
750 DO 1091 J=1,N
760 1091 XXX(I,J)=0.
770 IT=N*1000
780 208 JT=IT/1000
790 IRX=IT-JT*1000
800 IP=JT+2;ITT=JT+1
810 A00=Q0(ITT)+((Q0(IP)-Q0(ITT))*IRX)/1000
820 A01=Q1(ITT)+((Q1(IP)-Q1(ITT))*IRX)/1000
830 A02=Q2(ITT)+((Q2(IP)-Q2(ITT))*IRX)/1000.
840 JT1=(IT+999)/1000
850 DO 4573 I=JT1,N
860 JJ=I+1
870 IF(ABS(X(I)).GT.1.E38) GO TO 4573
880 X(I)=V0(JJ)*EXP(A00*LT(I))
890 X(I)=X(I)+V1(JJ)*EXP(A01*LT(I))*COS(A02*LT(I)+V2(JJ))
900 IF(ABS(X(I)).GT.1.E38) LOF=100
910 IF(LOF.EQ.100) I=N
920 4573 CONTINUE
930 IF(LOF.EQ.100) SS=1.E38
940 IF(LOF.EQ.100) GO TO 3737
950 DO 5435 JKL=1,17
960 5435 LT(JKL)=N*1000-IT+IDELTA

```

```

270 DO 4572 I=JT1,N
280 DO 4571 J=J,N
290 IF (ABS(XXX(I,J)).GT.1.E38) GO TO 4571
300 XXX(I,J)=XXX(I,J)+X(I)*X(J)*IDELTA
310 IF(ABS(XXX(I,J)).GT.1.E38) LOF=100
320 IF(LOF.EQ.100) J=N
330 4571 CONTINUE
340 IF(LOF.EQ.100) J=N
350 IF(LOF.EQ.100) SS=1.E38
360 4572 CONTINUE
370 IF (LOF.EQ.100) GO TO 3737
380 IT=IT-IDELTA
390 IF(IT.EQ.0) GO TO 999
400 GO TO 208
410 SS=-(COV(5,12)-XXX(5,12))**2
420 NSOE=7
430 DO 377 I=1,N
440 IF(SS.GT.1.E38) I=17
450 LT(I)=0
460 NSOE=NSOE+1
470 IF(NSOE.GT.N) NSOE=N
480 DO 377 J=I,NSOE
490 E=COV(I,J)-XXX(I,J)
500 377 SS=SS+E**E
510 3737 LOF=0
520 IF(NOO.EQ.100) GO TO 3111
530 GO TO (3001,3002,3003,3004,3005,3006,3007),NSTP
540 3001 IF(SSS.GT.SS)GO TO 3111
550 IF(NOS.NE.0)GO TO 4312
560 NOS=1;PRINT:"Q=-.50"
570 Q=-.5*C
580 GO TO 7766
590 4312 Q=.5*C;PRINT:"Q=.50"
600 GO TO 7766
610 3111 CONTINUE
620 IF(NSTOP.EC.100) GO TO 1240
630 IF(NAGC.GT.1) GO TO 1357
640 C=0*2.
650 Q=.05*C;NAGC=10;NOO=100;NSTOP=0;SS0=SS;GO TO 7766
660 1357 IF(SS.LT.SS0)GO TO 7531
670 S=-C;NSTOP=100;MFF=MFF+1;RRR=0;IF(MFF.EQ.5) GO TO 3939
680 DO 1135 I=1,17
690 GO TO(4301,4302,4303,4304),MFF
700 4304 RV1(I)=0.;4303 R00(I)=0.
710 4302 R02(I)=0.;4301 R01(I)=0.
720 MFF=RRR+RV1(I)**4+RV2(I)**4+R00(I)**4+R01(I)**4+R02(I)**4
730 1135 CONTINUE
740 SSS=1.005*Ss

```

```

1450 IF(FFF.E1.5) GO TO 2929
1460 3939 MFF=0;GO TO 7766
1470 7531 SFC=SS;GO TO 7766
1480 1940 SSB=SS
1490 PI INT 503,SSB,RR
1500 503 FORMAT(6H E**2=,1PD12.3,4H RR=,1PD12.3)
1510 NSTOF=0;NAGC=0;NUC=0
1520 NSTP=2
1530 LSTOF=1
1540 IF(LSTOF.NE.1) GO TO 150
1550 READ:NXYZ
1560 IF(NXYZ.NE.99) GO TO 150
1570 PRINT 501
1580 500 FORMAT(4H ALT,6X,3H D0,8X,6H SLOPE,1H0)
1590 DO 501 K=2,NSS
1600 501 PRINT: V0(K),V1(K),V2(K),Q0(K),Q1(K),Q2(K)
1610 502 FORMAT(12,1P2D12.3)
1620 GO TO 150
1630 3002 RV0(NA)=SS
1640 V0(NA)=V0(NA)/1.0001
1650 GO TO 4444
1660 3003 RV1(NA)=SS
1670 V1(NA)=V1(NA)/1.0001
1680 GO TO 4444
1690 3004 RV2(NA)=SS
1700 V2(NA)=V2(NA)/1.0001
1710 GO TO 4444
1720 3005 RQ0(NA)=SS
1730 Q0(NA)=Q0(NA)/1.0001
1740 GO TO 4444
1750 3006 RQ1(NA)=SS
1760 Q1(NA)=Q1(NA)/1.0001
1770 GO TO 4444
1780 3007 RQ2(NA)=SS
1790 Q2(NA)=Q2(NA)/1.0001
1800 4444 CONTINUE
1810 NSTP=NSTP+1
1820 PRINT:NSTP
1830 READ:WERT
1840 GO TO 150
1850 1250 DO 1340 J=1,NSS
1860 IF(J.EQ.1) GO TO 6765
1870 RV0(J)=(SSS-RV0(J))/V0(J)
1880 RV1(J)=(SSS-RV1(J))/V1(J)
1890 RV2(J)=(SSS-RV2(J))/V2(J)
1900 6765 CONTINUE
1910 RQ0(J)=(SSS-RQ0(J))/Q0(J)
1920 RQ1(J)=(SSS-RQ1(J))/Q1(J)

```

```

1930 R02(J)=(SSS-R01(J))/Q2(J)
1940 RRR=RRR+RV0(J)**4+RV1(J)**4+RV2(J)**4
1950 RRR=RRR+R00(J)**4+R01(J)**4+R02(J)**4
1960 WRITE("PART",1400) -10000.*RV0(J),-10000.*RV1(J),-10000.*RV2(J)
1970 WRITE("PART",1400) -10000.*R00(J),-10000.*R01(J),-10000.*R02(J)
1980 1340 CONTINUE
1990 BEGIN FILE "PART"
2000 2929 CONTINUE
2010 NSTOP=0;NAGC=0;NQQ=0
2020 RR=RRR**.5
2030 RN=1.E8*RR
2040 RRR=0
2050 NQS=0
2060 C=-1.E4*SSS/RR
2070 7766 CONTINUE
2080 BEGIN FILE "FCD"
2090 DO 2345 J=1,17
2100 IF(J.EC.1) GO TO 1825
2110 V1(J)=V1(J)-RV1(J)*Q
2120 V0(J)=V0(J)-Q*RV0(J)
2130 V2(J)=V2(J)-RV2(J)*Q
2140 1825 CONTINUE
2150 Q1(J)=Q1(J)-R01(J)*Q
2160 Q0(J)=Q0(J)-R00(J)*Q
2170 Q2(J)=Q2(J)-R02(J)*Q
2180 IF(NAGC.NE.10) GO TO 2345
2190 WRITE("FCD",1400)V0(J),V1(J),V2(J)
2200 WRITE("FCD",1400)Q0(J),Q1(J),Q2(J)
2210 2345 CONTINUE
2220 V2(1)=100.
2230 PRINT :SS
2240 V0(1)=100.;V1(1)=100.
2250 NSTP=1
2260 GO TO 150
2270 END

```

*LIST

10 DIMENSION Q0(18),Q1(18),Q2(18),P(5) 5 FT Q0
20 1400 FORMAT(V)
30 D0 987 I=1,17
40 D0 988 J=1,2
50 PEAD("FCD",1400) Q0(I),Q1(I),Q2(I)
60 988 CONTINUE
70 987 CONTINUE
80 L=18
90 BEGIN FILE "90"
100 4444 CONTINUE
110 PRINT:L
120 D0 777 I=1,5
130 KL=L-I
140 P(I)=Q0(KL)
150 777 CONTINUE
160 AA11=P(1)-4*P(2)+6*P(3)-4*P(4)+P(5)
170 AA11=AA11/(24.E12)
180 AA22=-5*P(1)+18*P(2)-24*P(3)+14*P(4)-3*P(5)
190 AA22=AA22/12.E9
200 AA33=35*P(1)-104*P(2)+114*P(3)-56*P(4)+11*P(5)
210 AA33=AA33/24.E6
220 AA44=-25*P(1)+48*P(2)-36*P(3)+16*P(4)-3*P(5)
230 AA44=AA44/12000.
240 AA55=P(1)
250 IF(L.NE.18) G0 T0 1111
260 D0 555 I=200,2200,200
270 LX=I-200
280 RES=AA11*LX*LX*LX*LX+AA22*LX*LX*LX+AA33*LX*LX+AA44*LX+AA55
290 RESP=4*AA11*LX*LX*LX+3*AA22*LX*LX+AA33*2*LX+AA44
300 WRITE("90",1400) RES,RESP
310 555 CONTINUE
320 L=L-1;G0 T0 4444
330 1111 CONTINUE
340 IF(L.EQ.6) G0 T0 9999
350 D0 909 I=1200,2000,200
360 LX=I
370 RES=AA11*LX*LX*LX*LX+AA22*LX*LX*LX+AA33*LX*LX+AA44*LX+AA55
380 RESP=4*AA11*LX*LX*LX+3*AA22*LX*LX+AA33*2*LX+AA44
390 WRITE("90",1400) RES,RESP
400 909 CONTINUE
410 L=L-1;G0 T0 4444
420 9999 CONTINUE
430 D0 2222 I=1200,5000,200
440 LX=I
450 RES=AA11*LX*LX*LX*LX+AA22*LX*LX*LX+AA33*LX*LX+AA44*LX+AA55
460 RESP=4*AA11*LX*LX*LX+3*AA22*LX*LX+AA33*2*LX+AA44
470 WRITE("90",1400) RES,RESP
480 2222 CONTINUE
490 PRINT:"END"
500 END

READY

5 FIT Q 1

```
10 DIMENSION Q0(18),Q1(18),Q2(18),P(5)
20 1400 FORMAT(V)
30 DO 987 I=1,17
40 DC 98F J=1,2
50 READ("FCD",1400) Q0(I),Q1(I),Q2(I)
60 98F CONTINUE
70 987 CONTINUE
80 L=1F
90 BEGIN FILE "Q1"
100 4444 CONTINUE
110 PRINT:L
120 DO 777 I=1,5
130 KL=L-1
140 P(I)=Q1(KL)
150 777 CONTINUE
160 AA11=F(1)-4*P(2)+6*P(3)-4*P(4)+P(5)
170 AA11=AA11/(24.E12)
180 AA22=-5*P(1)+18*P(2)-24*P(3)+14*P(4)-3*P(5)
190 AA22=AA22/12.E9
200 AA33=35*P(1)-104*P(2)+114*P(3)-56*P(4)+11*P(5)
210 AA33=AA33/24.E6
220 AA44=-25*P(1)+48*P(2)-36*P(3)+16*P(4)-3*P(5)
230 AA44=AA44/12000.
240 AA55=P(1)
250 IF(L.NE.18) GO TO 1111
260 DO 555 I=200,2200,200
270 LX=I-200
280 RES=AA11*LX*LX*LX*LX+AA22*LX*LX*LX+AA33*LX*LX+AA44*LX+AA55
290 RESP=4*AA11*LX*LX*LX+3*AA22*LX*LX+AA33*2*LX+AA44
300 WRITE("Q1",1400) RES,RESP
310 555 CONTINUE
320 L=L-1;GO TO 4444
330 1111 CONTINUE
340 IF(L.EG.6) GO TO 9999
350 DO 909 I=1200,2000,200
360 LX=I
370 RES=AA11*LX*LX*LX*LX+AA22*LX*LX*LX+AA33*LX*LX+AA44*LX+AA55
380 RESP=4*AA11*LX*LX*LX+3*AA22*LX*LX+AA33*2*LX+AA44
390 WRITE("Q1",1400) RES,RESP
400 909 CONTINUE
410 L=L-1;GO TO 4444
420 9999 CONTINUE
430 DO 2222 I=1200,5000,200
440 LX=I
450 RES=AA11*LX*LX*LX*LX+AA22*LX*LX*LX+AA33*LX*LX+AA44*LX+AA55
460 RESP=4*AA11*LX*LX*LX+3*AA22*LX*LX+AA33*2*LX+AA44
470 WRITE("Q1",1400) RES,RESP
480 2222 CONTINUE
490 PRINT:"END"
500 END
500 END
```

?FANY

5 FIT Q2

10 DIMENSION Q001(18),Q01(18),Q2(18),P(5)
20 140P FORMAT(V)
30 DO 987 I=1,17
40 DO 988 J=1,2
50 READ("FCD",1400) Q0(I),Q1(I),Q2(I)
60 988 CONTINUE
70 987 CONTINUE
80 L=18
90 BEGIN FILE "Q2"
100 4444 CONTINUE
110 PRINT:L
120 DO 777 I=1,5
130 KL=L-I
140 P(I)=Q2(KL)
150 777 CONTINUE
160 AA11=P(:)-4*P(2)+6*P(3)-4*P(4)+P(5)
170 AA11=AA11/(24.E12)
180 AA22=-5*P(1)+18*P(2)-24*P(3)+14*P(4)-3*P(5)
190 AA22=AA22/12.E9
200 AA33=335*P(1)-104*P(2)+114*P(3)-56*P(4)+11*P(5)
210 AA33=AA33/24.E6
220 AA44=-25*P(1)+48*P(2)-36*P(3)+16*P(4)-3*P(5)
230 AA44=AA44/12000.
240 AA55=P(1)
250 IF(L.NE.18) GO TO 1111
260 DO 555 I=200,2200,200
270 LX=I-200
280 RES=AA11*LX*LX*LX*LX+AA22*LX*LX*LX+AA33*LX*LX+AA44*LX+AA55
290 RESP=4*AA11*LX*LX*LX+3*AA22*LX*LX+AA33*2*LX+AA44
300 WRITE("Q2",1400) RES,RESP
310 555 CONTINUE
320 L=L-1;GO TO 4444
330 1111 CONTINUE
340 IF(L.EQ.6) GO TO 9999
350 DO 909 I=1200,2000,200
360 LX=I
370 RES=AA11*LX*LX*LX*LX+AA22*LX*LX*LX+AA33*LX*LX+AA44*LX+AA55
380 RESP=4*AA11*LX*LX*LX+3*AA22*LX*LX+AA33*2*LX+AA44
390 WRITE("Q2",1400) RES,RESP
400 909 CONTINUE
410 L=L-1;GO TO 4444
420 9999 CONTINUE
430 DO 2222 I=1200,5000,200
440 LX=I
450 RES=AA11*LX*LX*LX*LX+AA22*LX*LX*LX+AA33*LX*LX+AA44*LX+AA55
460 RESP=4*AA11*LX*LX*LX+3*AA22*LX*LX+AA33*2*LX+AA44
470 WRITE("Q2",1400) RES,RESP
480 2222 CONTINUE
490 PRINT:"END"
500 END

READY

```
10 1400 FORMAT(V)
20 BEGIN FILE "C"
30 IT=0
40 DC 93 I=1,82
50 READ("00",1400)A1,A1P
60 READ("01",1400) A2,A2P
70 READ("02",1400)W,WP
80 C1=A1+IT*A1P
90 C2=2*(A2+A2P*IT)
100 C2=C2+2*WP/(WP*IT+W)
110 C3=(W+WP*IT)**2+(A2+A2P*IT)**2
120 C3=-C3+2*A2P-2*WP*(A2+A2P*IT)/(WP*IT+W)
130 WRITE("C",1400) C1,C2,C3
140 IT=IT+200
150 93 CONTINUE
160 END
```

READY

*LIST C

FILTER

~~~~~  
I C C

```
10 COMMON A2(82),A2P(82),W(82),WP(82)
20 COMMON C1(82),C2(82),C3(82)
30 COMMON Q0(17),Q1(17),Q2(17)
40 COMMON V0(17),V1(17),V2(17)
50 1400 FORMAT(V)
60 BEGIN FILE "IC"
70 DO 10 I=1,81
80 J=82-I
90 READ("Q1",1400)A2(J),A2P(J)
100 READ("Q2",1400) W(J),WP(J)
110 10 CONTINUE
120 DO 20 I=1,17
130 READ("FCD",1400) V0(I),V1(I),V2(I)
140 READ("FCD",1400) Q0(I),Q1(I),Q2(I)
150 20 CONTINUE
160 DO 30 I=1,17
170 J=(17-I)*1000
180 AA=V0(I)*EXP(Q0(I)*J)
190 BB=V1(I)*EXP(Q1(I)*J)*COS(V2(I)+Q2(I)*J)
200 CC=BB*(A2(S*(I-1)+1)+J*A2P(S*(I-1)+1))
210 XY=-V1(I)*EXP(Q1(I)*J)*SIN(Q2(I)*J+V2(I))
220 XY=XY*(W(S*(I-1)+1)+WP(S*(I-1)+1)*J)
230 CC=CC+XY
240 WRITE("IC",1400)AA,BB,CC
250 30 CONTINUE
260 PRINT:"END"
270 END
```

READY

\*

LIST ROFTCAL

```
5 COMMON C1(82),C2(82),C3(82)
10 1400 FORMAT(V)
20 DO 73 I=1,81
25 J=82-I
30 READ("C",1400) C1(J),C2(J),C3(J)
40 73 CONTINUE
50 A1=2*.627981
55 A2=6*.0181523
60 A3=-4.80627E-5*12
70 V0=1.651812
75 BEGIN FILE "ROFT"
80 DO 133 I=1,91
90 T1=I-1
140 AA=A1+A2*T1+A3*T1*T1
150 VV=A1*T1+A2*T1*T1/2.+A3*T1*T1*T1/3.+V0
160 HH=A1*T1*T1/2.+A2*T1*T1*T1/6.+A3*T1*T1*T1*T1/12.+V0*T1
190 IHH=HH/200+1
200 RH=(HH-(IHH-1)*200)/200.
210 X=(C1(IHH+1)-C1(IHH))*RH
220 Y=(C2(IHH+1)-C2(IHH))*RH
230 Z=(C3(IHH+1)-C3(IHH))*RH
240 X=X+C1(IHH)
250 Y=Y+C2(IHH)
260 Z=Z+C3(IHH)
270 R1=X*VV
280 R2=Y*VV+AA/VV
290 R3=Z*VV*'/V
300 WRITE("ROFT",1400) T1,R1,R2,R3
400 133 CONTINUE
999 END
```

READY

ECONOM  
RECOMM

LIST TIC-CAL

```
10 1400 FORMAT(V)
20 BEGIN FILE "TIMEIC"
30 READ("IC",1400) A,B,C
40 WRITE("TIMEIC",1400) A,B,C
50 A1=2*.627981
60 A2=6*.0181523
70 A3=-4.80627E-5*12
80 V0=1.651812
90 100 READ("IC",1400) A,C,B
100 READ("START" ,1400) E ,F,G
110 VV=A1*E+A2*E*E/2.+A3*E*E*E/3.+V0
120 B=B*VV
130 WRITE("TIMEIC",1400) A,B,C
140 I=F/1000.
150 IF(I.EQ.16) STOP
160 GO TO 100
170 END
```

READY

\*BY\*D